**Online Supplemental File: Tables**

**Table 1: Risk of bias assessment of included systematic reviews with the SIGN checklist34**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **First Author and Year Published** | **Itemsa on SIGN Checklist** | | | | | | | | | | | | | |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **Total** | **Qualityb** |
| Belogolovsky, 201546 | **1** | **1** | **1** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **1** | **1** | **6** | **A** |
| Boissonnault, 201248 | **1** | **1** | **0** | **0** | **0** | **0** | **1** | **1** | **1** | **0** | **0** | **1** | **6** | **A** |
| Close, 201449 | **1** | **1** | **0** | **0** | **1** | **0** | **1** | **1** | **1** | **1** | **1** | **1** | **9** | **A** |
| Gutke, 201531 | **1** | **1** | **0** | **0** | **1** | **1** | **1** | **1** | **1** | **1** | **0** | **0** | **8** | **A** |
| Hall, 201639 | **1** | **1** | **1** | **1** | **0** | **1** | **1** | **1** | **1** | **1** | **1** | **1** | **11** | **H** |
| Ho, 200953 | **1** | **1** | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **1** | **1** | **5** | **L** |
| Khorsan, 200941 | **1** | **1** | **1** | **0** | **1** | **0** | **1** | **1** | **1** | **1** | **1** | **1** | **10** | **H** |
| Liddle, 201540 | **1** | **1** | **1** | **1** | **1** | **1** | **1** | **1** | **1** | **1** | **1** | **1** | **12** | **H** |
| Lillios, 201247 | **1** | **1** | **0** | **0** | **1** | **0** | **1** | **1** | **1** | **0** | **0** | **1** | **7** | **A** |
| Nascimento, 201242 | **1** | **1** | **1** | **0** | **0** | **0** | **1** | **0** | **0** | **1** | **1** | **1** | **7** | **A** |
| Richards, 201245 | **1** | **1** | **0** | **0** | **1** | **0** | **1** | **1** | **1** | **0** | **1** | **1** | **8** | **A** |
| Ruffini, 201638 | **1** | **1** | **1** | **1** | **1** | **1** | **1** | **1** | **0** | **1** | **1** | **1** | **11** | **H** |
| Stuber, 200821 | **1** | **1** | **1** | **1** | **1** | **0** | **1** | **1** | **1** | **0** | **1** | **0** | **9** | **A** |
| Stuge, 200344 | **1** | **1** | **1** | **0** | **1** | **0** | **1** | **1** | **1** | **1** | **1** | **0** | **9** | **A** |
| van Benten, 201488 | **1** | **1** | **1** | **0** | **0** | **0** | **1** | **1** | **1** | **1** | **0** | **1** | **8** | **A** |
| VanKampen, 201552 | **1** | **1** | **0** | **0** | **0** | **0** | **0** | **1** | **1** | **0** | **0** | **1** | **5** | **L** |
| Verstraete, 201351 | **1** | **1** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **L** |
| Waller, 200943 | **1** | **1** | **0** | **0** | **0** | **0** | **1** | **1** | **1** | **1** | **0** | **0** | **6** | **A** |

Scottish Intercollegiate Guideline Network (SIGN)

a,bSee Figure 2 for Quality assessment SIGN checklist itemsa and scoringb for systematic reviews

**Table 2: Systematic reviews of Effectiveness by Condition and Treatment with Quality (Risk of Bias) Rating**

|  |  |  |  |
| --- | --- | --- | --- |
| **Condition** | **Treatment** | **Quality\*** | **First Author, Year Published** |
| **Pregnancy LBP** | Chiropractic Care | A | Stuber, 200821 |
| SMT | H | \*\*Liddle, 201640 |
| L | Van Kampen52 |
| Exercise | H | \*\*Liddle, 201640 |
| A | \*\*Gutke, 201531 |
| A | Nascimento, 201242 |
| L | Van Kampen, 201552 |
| Water exercise | A | Waller, 200943 |
| OMT | H | Ruffini, 201638 |
| H | \*\*Liddle, 201640 |
| A | \*\*Gutke, 201531 |
| Electrotherapy | H | \*\*Liddle, 201640 |
| A | \*\*Gutke, 201531 |
| Support devices | H | \*\*Liddle, 201640 |
| **Pregnancy PGP** | Exercise | H | \*\*Liddle, 201640 |
| A | \*\*Gutke, 201531 |
| L | \*\*Verstraete, 201351 |
| L | \*\*Van Kampen, 201552 |
| Patient education | H | \*\*Liddle, 201640 |
| A | \*\*Gutke, 201531 |
| Information | L | \*\*Verstraete, 201351 |
| L | \*\*Van Kampen, 201552 |
| Support device | H | \*\*Liddle, 201640 |
| A | \*\*Gutke, 201531 |
| L | \*\*Verstraete, 201351 |
| L | \*\*Van Kampen, 201552 |
| **Pregnancy LBP and/or PGP** | SMT | H | Khorsan, 200941 |
| A | \*\*van Benten, 201488 |
| Multimodal care | H | \*\*Liddle, 201540 |
| A | \*\*Richards, 201245 |
| A | \*\*van Benten, 201488 |
| Exercise | H | \*\*Liddle, 201540 |
| A | \*\*Gutke, 201531 |
| A | \*\*Stuge, 200344\*\* |
| A | van Benten, 201488 |
| A | \*\*Richards, 201245 |
| A | Belogolovsky, 201546 |
| A | Lillios, 201247 |
| A | Boissonnault, 201248 |
| L | \*\*Van Kampen, 201552 |
| OMT | H | \*\*Liddle, 201540 |
| A | \*\*van Benten, 201488 |
| CAM | H | Hall, 201639 |
| A | Close, 201449 |
| Support devices | A | \*\*Gutke, 201531 |
| A | \*\*van Benten, 201488 |
| A | \*\*Richards, 201245 |
| L | Ho, 200953 |
| Patient education | A | \*\*Gutke, 201531 |
| Physiotherapy | A | Stuge, 200344 |

\*Scottish Intercollegiate Guideline Network (SIGN) Quality rating: >9=high quality, low risk of bias (H); 6-9=acceptable quality, moderate risk of bias (A); <6=low quality, high risk of bias (L); \*\*SR that examines a number of treatment options

OMT = Osteopathic manipulative therapy; SMT = Spinal manipulative therapy

**Table 3a: Summary of systematic reviews by treatment type with participant information, quality rating,**

**and overall study conclusion for women experiencing pregnancy-related LBP (n=7).**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Treatment / Intervention** | **Quality\*** | **First Author, Year Published** | **Number of studies, participants and type of studies** | **Grading used and Quality of studies** | **Conclusion** |
| **Chiropractic care** | A | Stuber, 200821 | 6 studies (297):  1 quasi-experimental single-group pretest-posttest design  4 case series  1 cross-sectional case series study | Down and Black (adapted):  1 Moderate,  3 low | Although chiropractic care is associated with improved outcomes in pregnancy-related LBP, the studies they examined were rated moderate to poor in methodological quality. |
| **SMT** | H | Liddle, 201540 (update from previous) 89-91 | 34 studies (n=5,121):  1 RCT | GRADE:  1 Low | There was no difference in pain and functional disability between women who received SMT, exercise or neuro emotional technique. |
| L | Van Kampen, 201552 | 17 studies (n=3,964):  1 RCT | PEDro Scale:  1 High | At least 50% of the women in each treatment group (SMT, exercise or mind-body treatment) experienced clinically meaningful improvements in pain symptoms. |
| **Exercise** | H | Liddle, 201540 (update from previous) 89-91 | 34 studies (n=5,121):  8 RCTs | GRADE:  8 Low | Exercise, land or water, may reduce pregnancy-related LBP and improves functional disability, compared to UOBC.  However, low-quality evidence also suggested no significant differences in the number of women reporting low-back pain between group exercise**,** added to information about managing pain, versus usual prenatal care |
| A | Gutke, 201531 | 56 studies (n, not provided):  4 RCTs and 2 CCTs | PEDro scale:  6 Moderate  1 Low | Almost all exercises performed at home or in a group reported positive effects on pain and disability compared to controls. However, the results did not indicate which type of exercises should be recommended as exercise protocol varied between studies. |
| A | Nascimento, 201242 | 19 studies, but those pertaining to pain and disability:  2 studies (n=905): 1 RCT  1 two-arm, two-center RCT | No analysis performed | Although the 2 RCTs show differing results with respect to pain intensity and functional ability, the authors suggest that overall, exercise during pregnancy provides benefits for maternal health such as decreasing musculoskeletal discomfort and improving quality of life. Furthermore, they suggest that active women are better able to handle their condition. |
| L | Van Kampen, 201552 | 17 studies (n=3,964):  4 RCTs | PEDro Scale:  2 High,  2 Fair | Confirmed the utility of exercise, either home- or group-based, to lessen pain and improve functional disability. |
| **Water exercise** | A | Waller, 200943 | 2 studies (n=648):  2 RCTs | PEDro scale:  1 High,  1 Low  SIGN:  1 High,  1 Moderate | They concluded that therapeutic aquatic exercise appears to be a safe and effective treatment modality for women experiencing pregnancy-related LBP. |
| **OMT** | H | Ruffini, 201638 | 24 studies (n=1840)  4 RCTs,  2 case controls  1 observational study  1 case series | GRADE:  1 High,  1 Moderate,  1 Low,  1 Unclear | Although they were unable to pool the data, the data from these studies suggested a positive effect of OMT compared to controls for improving disability scores, pain during pregnancy and autonomic function. |
| H | Liddle, 201540 (update from previous) 89-91 | 34 studies (n=5,121):  3 RCTs | GRADE:  1 Moderate  2 Low | OMT, added to UOBC, relieved pain and functional disability better than UOBC alone. However, OMT did not improve the same outcomes when adding placebo ultrasound to UOBC. |
| A | Gutke, 201531 | 58 studies (n, not provided):  1 RCT | PEDro scale:  1 High | Although the evidence is limited, OMT significantly decreased pain intensity and disability compared to a general treatment with out without sham-ultrasound. |
| **Electrotherapy** | H | Liddle, 201540 (update from previous) 89-91 | 34 studies (n=5,121):  1 RCT | GRADE:  1 Low | TENS improves pain and functional disability significantly more when applied in late pregnancy. |
| A | Gutke, 201531 | 56 studies (n, not provided):  1 RCT | PEDro scale:  1 Moderate | Although limited evidence, TENS use demonstrated a significantly greater decrease in pain and increase in function when compared to exercise and acetaminophen groups. |
| **Support devices** | H | Liddle, 201540 (update from previous) 89-91 | 34 studies (n=5,121):  2 RCTs  (1 abstract only) | GRADE:  2 Low | No significant difference between the belts to relieve pain or decrease functional disability. However, 1 small study using KT might significantly provide more pain relief that exercise. |

\*Scottish Intercollegiate Guideline Network (SIGN) Quality rating: >9=high quality, low risk of bias (H); 6-9=acceptable quality, moderate risk of bias (A); <6=low quality, high risk of bias (L)

GRADE = Grading of recommendations, assessment, development, evaluation; CCT = Controlled clinical trial; KT = Kinesiotape; OMT = Osteopathic manipulative therapy; PEDro = Physiotherapy evidence database scale; RCT = Randomized control trials; SMT = Spinal manipulation therapy; TENS = Transcutaneous electical nerve stimulation; UOBC = Usual obstetric care

**Table 3b: Summary of systematic reviews by treatment type with participant information, quality rating,**

**and overall study conclusion for women experiencing pregnancy-related PGP (n=4).**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Treatment / Intervention** | **Quality\*** | **First Author, Year Published** | **Number of studies, participants and type of studies** | **Grading used and Quality of studies** | **Conclusion** |
| **Exercise** | H | Liddle, 201540 (update from previous) 89-91 | 34 studies (n=5,121):  3 RCTs | GRADE:  1 Moderate,  2 Low | There is very little evidence that group exercise, in addition to information, may help manage pain compared to UOBC. |
| A | Gutke, 201531 | 58 studies (n, not provided):  5 RCTs | PEDro scale:  4 High,  1 Moderate | Almost all exercises performed at home or in a group reported positive effects on pain and disability compared to controls. However, the results did not indicate which type of exercises should be recommended as exercise protocol varied between studies. |
| L | Verstraete, 201351 | 68 articles included:  6 RCTs  1 guideline  1 review  1 narrative | Analysis unclear | Although no treatment option can guarantee full recovery, stabilizing training, muscle strengthening exercise and group exercise, as well as advice and information may reduce anxiety, reduce pain and enhance functional and coping abilities. Care should include a multidisciplinary management approach. |
| L | Van Kampen, 201552 | 17 studies (n=3,964):  3 RCTs | PEDro Scale:  2 High,  1 Fair | Although the studies in this review confirmed the utility of exercise to decrease pain and increase functional disability. When examining the effect of exercise on PGP, most of the RCTs included improved over time but not necessarily between groups. |
| **Patient education** | H | Liddle, 201540 (update from previous) 89-91 | 34 studies (n=5,121):  1 RCT | GRADE:  1 Low | Information in a birth preparation plan on exercise and how to manage PGP was no more effective in managing pain intensity compared to UOBC. |
| A | Gutke, 201531 | 58 studies (n, not provided):  1 RCT  3 CCTs (not included in the level of evidence) | PEDro scale:  1 Moderate | The 1 RCT included found no difference between the treatment and control groups. The CCTs included here dealt with a multimodal approach that included education. It was reported that women in these groups experienced less discomfort and decreased pain intensity compared to controls. |
| **Information** | L | Van Kampen, 201552 | 17 studies (n=3,964):  1 RCT | PEDro Scale:  1High, | PGP improved with time without any significant effects between the groups. |
| L | Verstraete, 201351 | 68 articles included:  6 RCTs  1 guideline  2 reviews  1 narrative  1 survey  1 quality analysis | Analysis unclear | To help reduce pain, information about the disorder itself, practical and anatomical information and possible contributing factors should be provided to the patient. This can include bed rest, avoiding activities that aggravate pain and strategies to minimize pain an prevent maladaptive behaviors. |
| **Support devices** | H | Liddle, 201540 (update from previous) 89-91 | 34 studies (n=5,121):  1 RCT | GRADE: | A non-rigid lumbopelvic belt and information significantly reduced pain and functional disability more than exercise and information for up to 6 weeks postpartum. However, the addition of a non-rigid belt to exercise plus information did not enhance the pain-relieving effects of exercise plus information only. |
| A | Gutke, 201531 | 58 studies (n, not provided):  2 RCTs | PEDro scale:  2 High | Supported by strong evidence, authors suggested using a non-rigid belt significantly decreased pain intensity and disability over the short term. A pelvic belt may be a first treatment choice to stabilize the pelvis before exercise treatment has taken effect. |
| L | Verstraete, 201351 | 68 articles included:  1 RCT  1 guideline  3 reviews  1 narrative | Analysis unclear | No RCT has investigated the use of pelvic belts as a single treatment option. It was suggested that the pelvic belt be used for symptomatic relief and applied for short periods of time. |
| L | Van Kampen, 201552 | 17 studies (n=3,964):  4 RCTs | PEDro Scale:  2 High,  2 Fair | The literature is not conclusive concerning the use of a lumbopelvic belt. Most studies indicated no significant effect on pain. |

\*Scottish Intercollegiate Guideline Network (SIGN) Quality rating: >9=high quality, low risk of bias (H); 6-9=acceptable quality, moderate risk of bias (A); <6=low quality, high risk of bias (L).

GRADE = Grading of recommendations, assessment, development, evaluation; CCT = Controlled clinical trial; OMT = Osteopathic manipulative therapy; PEDro = Physiotherapy evidence database scale; RCTs = Randomized control trials; SMT = Spinal manipulation therapy; UOBC = Usual obstetric care

**Table 3c: Summary of systematic reviews by treatment type with participant information, quality rating,**

**and overall study conclusion for women experiencing pregnancy-related LBP and/or PGP (n=15).**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Treatment / Intervention** | **Quality\*** | **First Author, Year Published** | **Number of studies, participants and type of studies** | **Grading used and Quality of studies** | **Conclusion** |
| **SMT** | H | Khorsan, 200941 | 13 studies (n>2,100): 1 RCT  6 case series,  2 case control studies  1 cohort study  1 other study design  2 SR | SIGN: 2 Strong (+), 6 Neither strong or weak,  5 weak (-) | The review described this limited evidence as emergent. However, the authors suggest that clinicians consider SMT as a treatment option for healthy pregnant women, without contraindications, who prefer this approach. |
| A | van Benten, 201488 | 22 studies (n=3,826):  1 RCT | CBRG Internal Validity  Check:  1 Good  Overall: Moderate quality | There is no evidence that manual therapy should be recommended for treatment of pregnancy-related lumbopelvic pain; 1 RCT reported positive effects on disability and pain however, no significant differences between groups were found. |
| **Multimodal care** | H | Liddle, 201540 (update from previous) 89-91 | 34 studies (n=5,121):  1 RCT | GRADE:  1 Low | Both groups, MOM intervention (manual therapy, exercise and education) and UOBC, reported a significant improvement in functional disability, but only those who participated in the MOM group reported improvements in pain. |
| A | van Benten, 201488 | 22 studies (n=3,826):  6 RCTs and 1 CCT | CBRG Internal Validity  Check:  3 Good  4 Poor  Overall: Moderate quality. | Almost all the RCTs that examined a combination of interventions, reported positive results with respect to pain, disability and/or sick leave. |
| A | Richards, 201245 | 4 studies (n=566)  1 RCT | CASP:  Moderate to high risk of bias | A multimodal intervention did not result in greater improvements in functional outcomes when measures with the DRI for pregnant women less that 32 wks gestation compared to acupuncture. |
| **Exercise** | H | Liddle, 201540 (update from previous) 89-91 | 34 studies (n=5,121): 4 4 RCTs | GRADE:  4 Moderate, | Exercise in general and an 8- to 12-wk exercise program, in particular, improved functional disability and reduced the number of women who reported LBP and/or PGP. Whereas group exercise plus information was not better at preventing either of these pains compared to UOBC. |
| A | Gutke, 201531 | 56 studies (n, not provided):  7 RCTs  2 CCTs | Pedro Scale:  2 High  6 Moderate  1 Low | Almost all exercises performed at home or in a group reported positive effects on pain and disability compared to controls. However, the results did not indicate which type of exercises should be recommended as exercise protocol varied between studies. |
| A | Stuge, 200344 | 9 trials (n=1,350);  2 RCTs  2 CCTs | Quality assessment form:  2 High  2 Moderate to Low | There was no strong evidence that exercise will help prevent or treat pregnancy-related back pain. However, water gymnastics demonstrated less pain intensity compared to no intervention. |
| A | Richards, 201245 | 4 studies (n=566)  2 RCTs | CASP:  2 Low to moderate risk of bias | Exercise in either an individual home exercise program or group setting has been shown to demonstrated improved functional outcomes. The types of exercise the authors suggested would be of benefit include core and pelvic floor muscle training as well as stretching should be included in the regime |
| A | van Benten, 201488 | 22 studies (n=3,826):  9 RCTs | CBRG Internal Validity  Check:  Overall: Moderate quality.  6 Good  3 Poor | Exercise also has a positive effect on pain, disability and/or sick leave in those with pregnancy related-LBP, but less evidence for those with PGP. Several studies demonstrated that stabilization exercises are effective in reducing pain and disability during pregnancy. |
| A | Belogolovsky, 201546 | 5 studies (n=143):  3 RCTs  2 cohort studies | Did not complete | All but one study reported significant improvements in pain and all but 2 studies reported improvements in functional outcomes relative to controls. The authors suggested that the most effective exercise programs had 2 important qualities in common: 1) functionality, positional transitions and variety as well as 2) supervision by exercise experts. In addition, other interventions investigated, such as yoga and hip/pelvic exercises, significantly diminished pain. |
| A | Lillios, 201247 | 7 studies (n=1,973):  4 RCTs  2 quasi-experimental designs (lacking randomization)  1 RCT (lacking a true control group) | PEDro scale:  Overall:  Fair to good.  2 High  4 Fair  1 Low | This SR concluded that there was no evidence to support exercise as the standard treatment for pregnancy related LPB and/or PGP nor is there a consensus as to the most effective treatment approach for this population. These authors suggest in order to have the most impact on pregnancy-related LBP or PGP, exercises should be specific incorporating local and global stabilizers and should be tailored to the individual. |
| A | Boissonnault, 201248 | 11 studies (n=1,891):  7 RCTs  2 quasi-RCT design  2 RCTs (lacking a control group) | PEDro scale:  3 Good,  6 Fair,  2 Poor | Overall, the authors believe that exercise may decrease LBP and PGP during pregnancy. However, they warn that, despite the strengths (attention to precision or accuracy of results) of 3 high-quality RCTs, drawing clinical conclusions must be done with caution and recognition of some of the methodological flaws. |
| L | Van Kampen, 201552 | 17 studies (n=3,578):  3 RCTs | PEDro Scale:  3 High | Although the results were inconclusive, the majority of studies in this review confirm the utility of exercise to decrease pain and disability. |
| **OMT** | H | Liddle, 201540 (update from previous) 89-91 | 34 studies (n=5,121):  1 RCT | GRADE:  1 Low | Significantly improved pain and related functional disability more than a waiting list control. |
| A | van Benten, 201488 | 22 studies (n=3,826):  1 RCT | CBRG Internal Validity  Check:  1 Good  Overall: Moderate quality | Although 1 RCT provided high-quality evidence that OMT improves pain and disability within groups and only disability between groups, the studies are limited, and there is no evidence that manual therapy should be recommended for treatment of pregnancy-related lumbopelvic pain. |
| **CAM** | H | Hall, 201639 | 11 full text articles (n=1,198):  10 RCTs | Cochrane Risk of Bias tool:  No overall scores were given. | Overall, they concluded that there is limited evidence to support the use of CAM to help manage pregnancy-related LBP and/or PGP. |
| A | Close, 201449 | 8 studies (n=1,042): 6 RCTs  1 pilot RCT  1 feasibility RCT | GRADE: Overall: Low strength | Without enough high-quality trials, these authors suggested there is limited evidence to support the use of CAM for managing pregnancy-related back pain. However, they do recognize that circumstances (i.e., pain becomes intolerable) may consider CAM therapy as it does have a good safety profile. |
| **Support devices** | A | Gutke,31 2015 | 56 studies (n, not provided):  1 RCT | PEDro scale:  1 Moderate | The use of a pelvic belt significantly decreased pain intensity. A pelvic belt may be a first treatment choice to stabilize the pelvis before exercise treatment has taken effect. |
| A | van Benten, 201488 | 22 studies (n=3,826):  1 RCT | CBRG Internal Validity  Check:  1 Good  Overall: Moderate quality. | There is no evidence to suggest the use of material support, such as belts, improves pregnancy-related back pain. |
| A | Richards, 201245 | 4 studies (n=566)  1 RCT | CASP:  Low to moderate risk of bias | Although there were improvements in pain in both groups, no differences were seen between groups. |
| L | Ho, 200953 | 10 studies (n=1909):  7 RCTs  1 quasi-RCT  2 CCTs | Not completed | This critical review suggests the effectiveness of using maternity support belts to reduce pregnancy-related LBP and/or PGP remains inconclusive. However, wearing a support belt, compared to no specific treatment, may be beneficial for pain relief and improved functional status in pregnant women experiencing LBP and/or PGP. There is limited evidence that using a support belt by itself prevents and/or treats pregnancy related LBP and/or PGP |
| **Patient education** | A | Gutke, 201531 | 56 studies (n, not provided):  3 CCTs | PEDro scale:  1 Moderate  2 Low | Women experienced less discomfort and decreased pain when compared with controls. However, the 3 CCTs were part of a multimodal approach to care. |
| **Physiotherapy** | A | Stuge, 200344 | 9 trials (n=1,350):  1 RCT  1 Quasi-RCT  1 CCT | Quality assessment form:  2 Moderate to Low | Although there is not strong evidence to recommend physiotherapy as an intervention to help treat or prevent pregnancy-related back pain, the authors indicate that physiotherapy should be individualized. |

\*Scottish Intercollegiate Guideline Network (SIGN) Quality rating: >9=high quality, low risk of bias (H); 6-9=acceptable quality, moderate risk of bias (A); <6=low quality, high risk of bias (L)

CAM = Complementary and alternative medicine; CASP = Clinical appraiser skills program; CBRG = Cochrane Back Review Group; CCT = Controlled clinical trial; Disability rating index = DRI; GRADE = Grading of recommendations, assessment, development, evaluation; LBP = Low back pain; MOM = Musculoskeletal and obstetric management; OMT = Osteopathic manipulative therapy; PGP = Pelvic girdle pain; PEDro = Physiotherapy Evidence Database scale; UOBC = Usual obstetric care; wk = week; wks = weeks

**Table 4: Risk of bias assessment of included randomized controlled trials34**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **First Author and Year Published** | **Itemsa on SIGN Checklist** | | | | | | | | | | | |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **Total** | **Qualityb** |
| Beyaz, 201159 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 3 | L |
| Carr, 200367 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 4 | L |
| Depledge, 200571 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 9 | H |
| Dumas, 199563 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 5 | L |
| Eggen, 201279 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 7 | A |
| Elden, 200569 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 9 | H |
| Figueira, 201461 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 3 | L |
| Garshasbi, 200560 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 5 | L |
| George, 201374 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 9 | H |
| Haakstad, 201578 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 6 | A |
| Hensel, 201565 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 7 | A |
| Kaplan, 201686 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 5 | L |
| Keskin, 201166 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 9 | H |
| Kihlstrand, 199962 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 5 | L |
| Kalus, 200885 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 8 | A |
| Kordi, 201272 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 4 | L |
| Kluge, 201177 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 6 | A |
| Licciardone, 201064 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 9 | H |
| Mahishale, 201482 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | L |
| Miquelutti, 201380 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 8 | A |
| Morkved, 200776 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 8 | A |
| Nilsson-Wikmar, 200570 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 7 | A |
| Ostgaard, 199483 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 4 | L |
| Ozdemir, 201581 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 8 | A |
| Peterson, 201273 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 7 | A |
| Sedaghati, 200758 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 4 | L |
| Stafne, 201275 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 9 | H |
| Suputtitada, 200256 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 7 | A |
| Thomas, 198968 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 4 | L |
| Wedenberg, 200087 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 5 | L |

SIGN, Scottish Intercollegiate Guideline Network  
a,bSee Figure 3 for Quality assessment SIGN checklist itemsa and scoringb for for randomized controlled trial

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**Table 5: Risk of bias assessment of included cohort studies34**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **First Author and Published year** | **Itemsa on SIGN checklist** | | | | | | | | | | | | | |  | |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **Total** | **Qualityb** |
| Morino, 201657 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 7 | A |
| Noren, 199784 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | L |

SIGN, Scottish Intercollegiate Guideline Network

a,bSee Figure 4 for Quality assessment SIGN checklist itemsa and scoringb for cohort studies

**Table 6: Randomized controlled trials and cohort studies of effectiveness by condition and treatment and**

**quality during pregnancy (risk of bias) rating from high to low**

|  |  |  |  |
| --- | --- | --- | --- |
| **Condition** | **Treatment** | **Quality** | **First Author, Year Published** |
| **LBP** | Exercise | Acceptable | Suputtitada, 200256 |
| Acceptable | \*Morino, 201657 |
| Low | Sedaghati, 200758 |
| Low | Beyaz, 201159 |
| Low | Garshasbi, 200560 |
| Low | Figueira, 201461 |
| Low | Dumas, 199563 |
| Low | Kihlstrand, 199962 |
| OMT | High | Licciardone, 201064 |
| Acceptable | Hensel, 201565 |
| Electrotherapy | High | Keskin, 201166 |
| Support devices | Low | Carr, 200367 |
| Low | Thomas, 198968 |
| **PGP** | Exercise | High | Elden, 200569 |
| Acceptable | Nilsson-Wikmar, 200570 |
| Support devices | High | Depledge, 200571 |
| Low | Kordi, 201372 |
| **LBP and/or PGP** | SMT/mobilizations | Acceptable | Peterson, 201273 |
| Multimodal care | High | George, 201374 |
| Exercise | High | Stafne, 201275 |
| Acceptable | Morkved, 200776 |
| Acceptable | Kluge, 201177 |
| Acceptable | Haakstad, 201578 |
| Acceptable | Eggen, 201279 |
| Acceptable | Miquelutti, 201380 |
| Acceptable | Ozdemir, 201581 |
| Low | Mahishale, 201482 |
| Low | Ostgaard, 199483 |
| Low | \*Noren, 199784 |
| Support devices | Acceptable | Kalus, 200885 |
| Low | Kaplan, 201686 |
| Physiotherapy | Low | Wedenberg, 200087 |

\*Cohort study

OMT = Osteopathic manipulative therapy; SMT = Spinal manipulative therapy

**Table 7a: Evidence tables for included randomized controlled trials and cohort studies\* in the treatment of**

**pregnancy-related LBP (High and Acceptable evidence only)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Citation and Quality** | **Patient population, Mean age, Gestational age, and Mean onset** | **Intervention and Dosage** | **Comparison Group(s) and Dosage** | **Outcome measures and timeline of measures (within gestation)** | **Outcome (within and non-VAS between groups) \*Underlined timepoints only** | **\*\*Converted:**  **VAS (100 mm) between groups mean change difference (95% CI)**  TG vs CG: | **Conclusion** | **Limitations** |
| ***Exercise*** | | | | | | | | |
| Suputtitada, 200256  Acceptable | n=74, primigravida with or without LBP  Age:  20-34 (range)  GA:  26-30 wks  Onset:  Most experienced back pain during pregnancy. | TG:  Sitting Pelvic Tilts conducted at home 3 days/wk and with the exercise instructor 2 days/wk  Increasing tilts from 4 up to 10 cycles | CG:  No exercise | Primary:  Proportion of women with pain  VAS  (10 cm)  Participant rated severity of pain  (0-‘No Pain’; 10-‘Worst Possible Pain’)  Measurement Timepoints:  26-30 wks  34-38 wks (8 wks following start of study) | *Within group:*  Proportion (% pain change):  TG: 90.7%  CG: 2.8%  VAS (Mean change)  TG: -5.09 cm, p<0.001  CG: 0.28 cm, NS  *Between groups:*  Proportion (% pain change):  TG vs CG: 87.9%,  p<0.001  VAS (Mean change)  TG vs CG: -5.46 cm, p<0.001 | -53.2  (-53.72 to -52.7) | Sitting pelvic tilt exercise was found to decrease the proportion and intensity of back pain in primiparas women during their third trimester. | Within group difference calculated using an ‘unpaired t-test’. |
| Morino, 201657\*  Acceptable | n=156, pregnant women with or without LBP  Age (mean yrs):  TG1=31.5  TG2=32.9  GA:  Less than 8 wks  Onset:  Not state | TG1: LBP group (at home walking)  TG2: non-LBP groups (at home walking)  Wear pedometer after usual prenatal checkup for 1 week bimonthly (8-11, 16-19, 24-27 and 32-35 wks gestation) | CG: None | ODI  Avg steps/day  Measurements:  8, 12, 16, 20, 24, 28, 32 and 36 wks gestation  \*calculated without the item “sex life” | *Within group:*  ODI  TG1: progressively increased during pregnancy, p<0.0063  Avg steps/day  1st to 2nd Tri:  TG1: 1, 226, p<0.013  TG2: 248, p=NS  2nd Tri  TG1: -500, p=NS  TG2: 1, 138, p=NS  2nd to 3rd tri  TG1: -1,020, p<0.013  TG2: -408, p=NS  *Between group:*  ODI  TG1 vs TG2 at each gestational measure, p<0.0063 | NA | Acute increases of daily step count in early pregnancy may be a risk factor for the development of LBP.  A gradual increase in steps after mid-pregnancy has been suggested to decrease the risk for the development of LBP. | Large number of drop out  Difference in activity levels from other studies making the results difficult to compare |
| ***Osteopathic Manipulative Therapy (OMT)*** | | | | | | | | |
| Licciardone, 201064  High | n=146, 3rd tri pregnant women with or without LBP  Age (mean yrs)  TG=23.8  CG1=23.7  CG2=23.8  GA:  28-30 wks  Onset:  Not stated. | TG:  UOBC + OMT-Standardized OMT protocol  Up to 7 tx in conjunction with OB appointments at 30, 32, 34, 36, 37, 38 and 39 wks gestation  30 min | CG1:  UOBC + SUT  CG2:  UOBC | NRS 11-point  -Average level of pain  -0-‘no pain’; 10-‘worst possible pain’  (NOTE: Analyzed as if obtained from a 10 cm VAS)  RDMQ  Measurement  Timepoints:  30, 32, 34, 36, 37, 38 and 39 wks (only determined effect size, which considered all timepoints) | *Within Group:*  Not presented; no response from author upon request of information  *Between Group:*  NRS  (Effect size (95% CI))  TG vs CG1: 0.14 (−0.26-0.55), p=0.48  TG vs CG2: 0.27 (−0.13-0.68), p=0.18  RMDQ  (Effect size (95% CI))  TG vs CG1: 0.35 cm (−0.06-0.76), p=0.09  TG vs CG2: 0.72 cm (0.31-1.14), p<0.001 | vs CG1:  -2.7 (not able to determine 95% CI)  vs CG2:  -1.4 (not able to determine 95% CI) | While not statistically significant OMT lessened LBP and disability with back-specific functioning deteriorating less in the OMT group. | Not balanced on some baseline characteristics (i.e., race/ethnicity; illicit drug use, health insurance type, employment).  Standardized OMT protocol, not individualized.  Beta was only 70%.  No descriptive statistics provided for outcome measures; reader can not verify findings. |
| Hensel, 201565  Acceptable | n=400, 3rd tri pregnant women  Age (mean yrs):  TG=24.0  CG1=24.1  CG2=24.7  GA:  30 wks  Onset:  Not stated | TG:  OMT-Standardized OMT protocol  7 visits within 24 hrs of OB visits  over 9 wks  20 min | CG1:  PUT  7 visits within 24 hrs of OB visits  20 min  over 9 wks  CG2:  UOBC | Primary:  Quadruple VAS (pain intensity at 4 timepoints – now, average, best, worst)  -0 to 100 scale, with higher values indicating higher pain  RMDQ  Measurement  Timepoints:  30, 32, 34, 36, 37, 38, and 39 wks (only determined effect size, which considered all time points) | *Within groups:*  RMDQ (effect size)  TG: 0.676  CG1: 0.469  CG2: 2.926  VAS (now) (effect size)  TG: -0.299 CG1: -0.034 CG2: 0.707  VAS (average) (effect size)  TG: -0.205 CG1: -0.364 CG2: 0.175  VAS (best) (effect size)  TG: -0.202 CG1: -0.154  CG2: 0.478  VAS (worst) (effect size)  TG: -0.482 CG1: -0.641 CG2: 0.296  *Between gro*ups:  RMDQ (effect size (95%CI))  TG vs CG1: 0.21 (-0.73 to 1.14), p>0.999  TG and CG2: -2.25 (-3.18 to -1.32), p<0.001  VAS (now) (effect size difference (95%CI))  TG vs CG1: -0.27 (-0.70 to 0.17), p=0.439  TG vs CG2: -1.01 (-1.44 to -0.57), p<0.001  VAS (average) (effect size difference (95%CI))  TG vs CG1: 0.16 (-0.24 to 0.56), p>0.999  TG vs CG2: -0.38 (-0.78 to 0.02), p=0.065  VAS (best) (effect size difference (95%CI))  TG vs CG1: -0.05 (-0.38 to 0.28), p>0.999  TG vs CG2: -0.68 (-1.00 to -0.36), p<0.001  VAS (worst) (effect size difference (95%CI))  TG vs CG1: 0.16 (-0.22 to 0.54), p=0.946  TG vs CG2: -0.78 (-1.15 to -0.40), p<0.01 | VAS (now):  vs CG1: -1.0 (not able to determine 95% CI)  vs CG2: -14.0 mm (not able to determine 95% CI)  VAS (average):  vs CG1: 5.0 (not able to determine 95% CI)  vsCG2: -8.0 (not able to determine 95% CI)  VAS (best):  vs CG1: -0.5 (not able to determine 95% CI)  vs CG2: -13.0 mm (not able to determine 95% CI)  VAS (worst):  vs CG1: 7.5 (not able to determine 95% CI)  vs CG2: -10 (not able to determine 95% CI)  \*\*Estimated mean change difference (visit 1 to 7) from Figure 2 | OMT was effective to mitigate pain and disability compared to the CG2 group but did not differ from the CG1 group. | Only 44% of the participant received the desired number of tx visits  Standardized OMT protocol, not individualized. |
| ***Electrotherapy*** | | | | | | | | |
| Keskin, 201166  High | n=88, pregnant women with LBP  Age (mean yrs):  TG1=30.7  TG2=29.7  TG3=29.1  CG=29.2  GA (median wk):  TG1=32.0  TG2=32.0  TG3=32.0  CG=32.0  Onset:  During pregnancy | TG1:  Exercise= home exercise program  10 x/ session,  2x daily  3 wks  TG2: Acetaminophen  1x500mg paracetamol tablet  2x/day  3wks  TG3:  TENS  6 sessions  2x/wk  3 wks | CG**:**  Not stated | VAS (‘intermittent scale’)  -assess the severity of pain  -0-‘no  pain’; 10-‘worst pain imaginable’  -  RMDQ  Measurement  Timepoints:  32 wks (baseline);  35 wks (3 wks following intervention) | *Within group:*  VAS (median change):  TG1: -1, p<0.001  TG2: -1, p<0.001  TG3: -3, p<0.001  CG: 1, p=0.003  RMDQ (median change):  TG1: -2, p<0.001  TG2: -2 p<0.001  TG3: -8.5, p<0.001  CG: 1, p=0.002  *Between group:*  VAS  All 3 TGs vs CG: p<0.001  TG3 vs TG1 and TG2: p<0.001  TG1 vs TG2: p=0.694  RMDQ  All 3 TGs vs CG: p<0.001  TG1 vs TG2: p=0.506 | vs CG: -40 (not able to determine 95% CI)  vs TG1: -20 (not able to determine 95% CI)  vs TG2: -20 (not able to determine 95% CI)  \*\*Estimated mean change difference from Figure 3 | Although exercise and acetaminophen helped to relieve LBP during the 3rd tri, TENS application seemed to be more effective.  TENS also appears to be a safe tx choice during pregnancy. | Small sample sizes.  No explanation of control group**.**  Median pre-tx VAS scores differed significantly  among groups. |

\*Cohort study

Avg = average; BPP = Birth preparation program = BPP; CG = Comparison group; CI = Confidence interval; cm = Centimeter; GA = Gestational age; hrs = Hours; LBP = Low back pain; mg = milligrams; min = Minute; NRS = Numerical rating scale; NS = Non-significant; OB = Obstetrician; ODI = Oswestry disability index; OMT = Osteopathic manipulative therapy; PGP = Pelvic girdle pain; Prev = Prevalence; PUT = Placebo ultrasound treatment; RMDQ = Roland-Morris disability questionnaire; SUT = Sham ultrasound therapy; TENS = Transcutaneous electrical nerve stimulation; TG = Treatment group; Tri = Trimester; tx = treatment; UOBC = Usual obstetric care; VAS = Visual analog scale; vs = Versus; wk = Week; wks = Weeks; yrs = Years

**Table 7b: Evidence tables for included randomized controlled trials in the treatment of pregnancy-related PGP**

**(High and Acceptable evidence only)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Citation and Quality** | **Patient population, Mean age, Gestational age, and Mean onset** | **Intervention and Dosage** | **Comparison Group(s) and Dosage** | **Outcome measures and timeline of measures (within gestation)** | **Outcome (within and non-VAS between groups) \*Underlined timepoints only** | **\*\*Converted:**  **VAS (100 mm) between groups mean change difference (95% CI)** | **Conclusion** | **Limitations** |
| ***Exercise*** | | | | | | | | | |
| Elden, 200569  High | n=386, pregnant women with PGP  Age (Mean yrs):  TG1=30.6  TG2=30.0  CG=30.8  GA (Mean wks):  All groups: 24  Onset:  Prior to enrollment (12-31 wks) | TG1:  Stabilizing exercises, massage, stretching + standard tx  6 hrs of individualized care over 6 wks and asked to perform exercises regularly  TG2: Acupuncture + general tx  2x/wk for  6 wks | CG: General tx: information, stabilizing pelvic belt and home exercise program | Morning VAS (100mm)  Evening VAS (100mm)  No bookends provided  Measurements:  Baseline and 1 wk following last treatment | *\*median*  *Within group:*  Morning VAS:  TG1: -4  TG2: -8  CG: 4  Evening VAS:  TG1: -15  TG2: -34  CG: -5 | *\*median*  Morning VAS:  vs CG: -9 (-12.8 to -1.7)  vs TG2: 3 (-0.3 to 7.8)  Evening VAS:  vs CG: -13 (-17.5 to -2.7)  vs TG2: 14 (3.3 to 18.1) | Stabilizing exercise (or acupuncture, slightly superior) in addition to standard tx resulted in a reduction PGP | Only examined differences before and after 6 wks of care during pregnancy, although daily VAS measurements taken  No long-term follow-up |
| Nilsson-Wikmar, 200570  Acceptable | n=118, pregnant women with PGP  Age (Mean yrs):  TG1=29.5  TG2=29.7  CG=28.4  GA (Mean wks):  TG1=22  TG2=21  CG=25  Onset:  *Before gestation-*  TG1: n=14  TG2: n=11  CG: n=9 *12-24 wks gestation-*  TG1: n=20  TG2: n=24  CG: n=18  *25-32 wks gestation-*  TG1: n=7  TG2: n=2  CG: n=13 | TG1:  Home exercise + CG  3 exercises aimed at stabilizing muscles around the pelvic girdle  TG2:  In-clinic exercise + CG  4 different strengthening and stabilizing exercises  3 sets, 15 reps  2x/wk  Until 39 wks  (PT gave instructions 2x) | CG: Information + non-elastic belt  Access to call PT with concerns | Primary:  VAS (100mm) for pain  Pain Drawing (not included in this review)  DRI  Measurements:  Inclusion, 38 wks gestation, 3, 6, 12 mos postpartum | *\*median*  *Within group:*  VAS:  TG1: 4 mm  TG2: 15 mm  CG: 0 mm  DRI  TG1: 28 mm  TG2: 19 mm  CG: 24 mm  *Between Group:*  DRI  TG1 vs CG:  -4 mm  TG2 vs CG:  -5 mm | *\*median*  TG1 vs CG: 4 (not able to determine 95% CI)  TG2 vs CG: 15 (not able to determine 95% CI) | No statistical significance between groups, but all groups, improved. | Manuscript included both pregnancy and post-partum data.  In-clinic exercise group included patients statistically significantly earlier than other groups. |
| ***Support devices*** | | | | | | | | |
| Depledge, 200571  High | n=87, pregnant women with symphysis pubis pain  Age: 29.5 yrs  GA:  Not reported  Onset 25.9 wks | TG1:  Exercise + Advice  TG2:  Exercise + Advice + NRSB  TG3:  Exercise + Advice + RSB  Exercises 3x/ daily for 1 wk | CG:  None | RMDQ (Modified)  PSFS  Avg NRS  (101-point)  Worst NRS  (101-pts)  Measurements:  Baseline and 1 wk after tx | *\*(% change)*  *Within Group*  RMDQ:  TG1: -22.7%  TG2: -15.9%  TG3: -17.0%  p<0.001, for all  PSFS:  TG1: -38.6%  TG2: -25.4%  TG3: -30.4%  p<0.001, for all  Avg NRS: TG1: -31.8%  TG2: -13.9%  TG3: -29.2%  p<0.001, for all  Worst NSR:  TG1: -22.6%  TG2: -12.7%  TG3: -10.8%  *Between Groups:*  RMDQ, PSFS: NS | Avg NRS:  TG1 vs TG2: 11  (1.4 to 20.6)  TG1 vs TG3: 0  (-8.5 to 8.5)  TG2 vs TG3: -11  (-21.7 to -0.3)  Worst NSR:  TG1 vs TG2: 12  (2.8 to 21.2)  TG1 vs TG3: 6  (-1.3 to 13.3)  TG2 vs TG3: -6  (-16.5 to 4.5)  \*\*Estimated mean change difference from Figures 4 and 5 | No significant difference was found between groups (except for average NRS), but all groups had significant decreases in all measures. | No untreated comparison group.  Short tx time (1 week)  Many of the participants found the belts uncomfortable.  Unsure who and how the questionnaires were administered. |

am = Morning; avg = Average; CG = Comparison group; DRI = Disability rating index; GA = Gestational age; hrs = Hours; min = Minute; mm = Millimeter; mos = Months; NRS = Numerical rating scale; NS = Non-significant; OB = Obstetrician; ODI = Oswestry Disability Index; OMT = Osteopathic manipulative treatment; PGP = pelvic girdle pain; pm= Evening; Prev = Prevalence; PSFS = Patient specific functional scale; PT = Physiotherapist; pts = Points; reps = Repetitions; NRS = Numeric rating scale; NRSB = Non-rigid support belt; NS = non-significant; RMDQ = Roland-Morris Disability questionnaire; RSB = Rigid support belt; SUT = Sham ultrasound therapy; TENS = Transcutaneous electrical nerve stimulation; TG = Treatment group; tri = Trimester tx = Treatment; UOBC = Usual obstetric care; VAS = Visual analog scale; vs = Versus; wk = Week; wks = Weeks; yrs = Years

**Table 7c: Evidence tables for included randomized controlled trials in the treatment of pregnancy-related**

**LBP and/or PGP (High and Acceptable evidence only)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Citation and Quality** | **Patient population, Mean age, Gestational age, and Mean onset** | **Intervention and Dosage** | **Comparison Group(s) and Dosage** | **Outcome measures and timeline of measures (within gestation)** | **Outcome (within and non-VAS between groups) \*Underlined timepoints only** | | **\*\*Converted:**  **VAS (100 mm) between groups mean change difference (95% CI)**  TG vs CG | **Conclusion** | **Limitations** |
| ***SMT/mobilization*** | | | | | | | | | |
| Peterson, 201273  Acceptable | n=57, pregnant women with LBP and/or PGP reproducible by palpation  Age (Mean yrs):  TG1=31.1  TG2=29.7  CG=28.7  GA (Mean wk):  TG1=25.7  TG2=27.0  CG=23.7  Onset:  TG1=16.1  TG2=13.9  CG=11.6 | TG1:  SMT= HVLA for L/S and SI JT; blocks used to adjust Sacro Occiptial Technique Category II pelvis; activator to adjust pelvis  TG 2:  NET=  chiropractic  mind-body technique; combines desensitization procedures with elements of Five Element Chinese medicine + chiropractic adjustment  Paralleled prenatal care schedule; 1x/mo until 28 wks; 2x/mo until 36 wks; 1x/wk thereafter | CG: Individualized home exercises + information  5x/wk  15 min | Primary:  RMDQ  Secondary:  NPRS (11-pts; no bookends provided)  Measurements:  Each tx (variable) – Baseline and 36 wks | *Within group:*  RMDQ  TG1**=-**4.6  TG2=-3.6  CG=**-**4.6  NPRS (Mean difference):  TG1=-1.6 TG2=-0.8  CG=-1.5  *Between group:*  RMDQ (mean change differences)  TG1 vs CG: 2.0, p=0.995  TG1 vs TG2: 1.6, p=0.45  TG2 vs CG: 0.3, p=0.712 | | TG1 vs CG: -1.0  (-13.0 to 11.0)  TG1 vs TG2: -0.8 (-19.4 to 0.3)  TG2 vs CG: 0.7 (-3.7 to 1.8) | All 3 interventions provide clinically meaningful improvement in function and pain intensity.  No between group differences were noted. | Insufficient time avail for satisfactory recruitment.  Potential investigator bias for tx effects.  Participants entering study at any point during pregnancy therefore hard to complete protocols.  Imputation method could have led to bias. |
| ***Multimodal care*** | | | | | | | | | |
| George, 201374  Acceptable | n=169, pregnant women with LPB and/or PGP  Age (Mean yrs):  TG=27.3  CG=26.6  GA (Mean wk):  TG= 3.5  CG=23.2  Onset:  Not stated | TG:  UOBC + MOM  Weekly visits with chiropractic specialist who provided education, manual therapy and stability exercises (to be done 2x/day) | CG:  UOBC  Obstetric provider could recommend tx options | NRS  (0: no pain -10: maximum level of pain)  QDQ  Measurements:  Baseline (24-28 wks) and 33 wks gestation | *Within Group:*  NRS:  TG=-2.9, p<0.01  CG=-0.1, p=0.62  QDQ:  TG= -1.0, p<0.01  CG= 0.6, p<0.01  *Between groups:*  QDQ  TG vs CG: -1.6, p<0.001 | | -28.0 (-35.2 to -20.8) | Combination of manual therapy, exercise and patient education reduces pain and disability when applied at 24-33 wks gestation compared to UOBC. | Low enrollment versus those screened.  Responses to complaints of LBP and/or PGP vary among obstetric providers.  Cannot discern which tx or combo of tx gave the most clinical benefit.  Did not use sham txs, nor was placebo controlled.  Did not evaluate prophylactic tx. |
| ***Exercise*** | | | | | | | | | |
| Stafne, 201275  High | n=855, pregnant women with or without LBP and/or PGP  Age (Mean yrs):  TG=30.5  CG=30.4  GA:  Enrolled 18-22 wks  Onset:  Not stated | TG:  Group exercise:  standardized aerobic + strengthening+ stretching + balance  1x/wk with PT for 60 min  12 wks  Home exercises: Same as above  2x/wk for 45 min  12 wks  Written information on PFM exercises, diet and pregnancy-related LPP | CG:  UOBC+ customary information  Written information on PFM exercises, diet and pregnancy-related LPP  (Could exercise on their own) | Self-report of LBP and/or PGP  DRI (100 mm)  Morning Disability VAS  (100 mm)  Evening Disability VAS  (100 mm)  Measurements:  Baseline 18-22 wks and follow up 32-36 wks gestation | *Within Groups:*  Frequency of pain difference (% change)  TG: -17%  CG:14%  Morning Disability VAS (mean change)  TG: 9.9 mm  CG: 7.2 mm  Evening Disability VAS (mean change)  TG: 10.3 mm  CG: 7.6 mm  DRI (mean change)  TG: 12.0 mm  CG: 12.4 mm  *Between groups:*  Frequency of pain difference (% change difference)  TG vs CG: 3%, p=0.76  Morning VAS (% change difference)  2.7, p=0.80  Evening VAS (% change difference)  2.7, p=0.92  DRI (change difference)  TG vs CG: -0.4, p=0.48 | *No pain scale provided.* | | Exercise did not affect LBP and/or PGP but women who exercised handled pain better (i.e., less sick leave). | Exercise adherence—some evidence that more adherent women had a slightly decreased OR of LBP and/or PGP.  An earlier intervention may have had different outcomes.  Self-reports of LBP and/or PGP and sick leave.  Did not differentiate between LBP and PGP. |
| Miquelutti, 201380  Acceptable | n=205, nulliparous pregnant women  Age (mean yrs):  TG=22.9  CG=22.9  GA (Mean wks):  TG=20.7  CG=20.4  Onset:  Not stated | TG:  BPP= Education and exercise  Same days as prenatal visits  50 min/ session | CG:  UOBC | PrevLBP  PrevPGP  VAS LBP  (10 cm)  VAS PGP  (10 cm)  Average pain over preceding day  No bookends provided  Measurement Timepoints:  18-24 wks,  28-30 wks and 36-38 wks | *Within groups:*  PrevLBP (% change)  TG: 4.7%  CG: -1.8%  PrevPGP (% change)  TG: 13.8%  CG: 12.6%  VAS LBP  (Mean change)  TG: 0.4 cm  CG: 0.3 cm  VAS PGP  (Mean change)  TG: 1.7 cm  CG: 1.2 cm  *Between groups:*  PrevLBP (RR (95% CI)) TG vs CG: 1.01 (0.79 to 1.27)  PrevPGP (RR (95% CI))  TG vs CG: 1.02 (0.62 to 1.68)  VAS LBP (Mean difference (95% CI))  TG vs CG: 0.34 cm  (-0.61 to- 1.28)  VAS PGP (Mean difference (95% CI))  TG vs CG: -0.38 cm (-2.09 to -1.33) | LBP:  1.0 (0.01 to 1.99)  PGP:  5.0  (3.13 to 6.87) | | No difference in LBP and/or PGP was found between groups.  (i.e., less sick leave). | Primary outcome in the study was gestational diabetes and glucose metabolism.  Some evidence that more adherent women had a slightly decreased OR of LBP and/or PGP  Self-reports of LBP and/or PGP and sick leave.  Did not differentiate between LBP and/or PGP. |
| Ozdemir, 201581  Acceptable | n=96, pregnant women with LBP and/or PGP  Age (mean yrs):  TG=29.2  CG=30.1  GA (mean wks):  TG=26.1  CG=27.3  Onset:  TG=19.3 wks gestation  CG=20.2 wks gestation | TG:  Education + individualized home exercise program  3 days/ wk  30 min. | CG:  UOBC  4 wks –follow-up phone calls | VAS  (100 mm)  Participant rated severity of LBP and PGP at rest and during activity  (0-‘No hurt’; 10-‘Hurts worst’)  ODI  Measurement Timepoints:  19-20 wks (baseline),  23-24 wks (after 4 wks) | *Within group:*  VAS (rest)  (Mean change)  TG: -20.69 mm, p<0.001  CG: 6.25 mm, p=0.204  VAS (activity)  (Mean change)  TG: -25.31 mm, p<0.001  CG: 2.69mm, p=0.258  ODI (Mean change)  TG: -5.85, p<0.001  CG: 0.67, p=0.546  *Between Groups:*  VAS (rest)  TG vs CG: -26.94 mm; p< 0.001  VAS (activity)  TG vs CG: -28.00 mm; p<0.001  ODI  TG vs CG: -5.56; p<0.001 | Rest:  -26.94 mm  (-27.95 to -25.93)  Activity:  -28.00 mm  (-28.47 to -27.53) | | A 4-wk individualized counseling and home exercise program was more effective than standard tx at relieving LBP. | Compliance with home exercise.  Possible self-report bias.  Diagnosis of LBP was based on oral history from patient. |
| Morkved 200776  Acceptable | n=301, nulliparous pregnant women with or without self-reports of LPP (LBP and PGP)  Age (Mean yrs):  TG=28.0  CG=26.9  GA:  Enrolled at 20 wks  Onset:  Not stated | TG:  Group exercises: aerobic + strength + stretch + CG  1 x/week  60 min  12 wks  Home exercises for PFM contractions + CG  2x/day  8-12 rep | CG:  Customary information from their midwife or general practitioner (could exercise on their own) | PrevLBP and/or PGP  Pain drawings  DRI  Measurements: 20 and 36-wks gestation and 3 mo postpartum | *Within Group:*  PrevLBP and/or PGP (% change) and DRI:  Not reported  Pain drawing:  TG: 1.0  CG: 13.0  *Between Group:*  PrevLBP and/or PGP (% change):  TG vs CG:  -12%, p=0.033  DRI (Median difference):  TG vs CG:  -5, p=0.011 | *No pain scale included.* | | A 12-wk specially designed training program was effective in preventing PrevLBP and/or PGP pain at 36-wks gestation. | Use of only self-reports and pain drawings and no clinic tests of LPP.  Not all women had LBP and/or PGP. |
| Kluge, 201177  Acceptable | n=50, pregnant women with LBP and/or PGP  Age (Mean yrs):  TG=27  CG=29  GA (Mean wk):  TG=20  CG=20  Onset:  Pain started during current pregnancy, prior to enrollment (16-24 wks) | TG:  Group exercise: for TVA and PFM + (progress to lower body strength) + stretch/relax  Home exercise program (same as above)  Back care and posture advice + pamphlet + UOBC  10-wk exercise program  Every 2nd wk it was group led  30-45 min  Intensity progressed in stages:  1 and 2–4 wks each  3–2 wks | CG:  Back care and posture advice and pamphlet + UOBC | 6-item Pain Questionnaire each with a 0-10 scale  (bookend not provided)  Likert-modified RMDQ  Measurements:  Baseline and 10 wks following intervention | *Within group:*  Pain Questionnaire (Median change)  TG: -11.5, p<0.01  CG: 2.0, p=0.89  Likert-modified RMDQ (Mean change)  TG: -31.5, p=0.06  CG: -0.5, p=0.70  *Between groups*:  After intervention  Pain Questionnaire  TG vs CG: p= <0.01  Likert-modified RMDQ  TG vs CG: p=0.03 | -13.5 (not able to determine 95% CI)  \*\*Based on the 6-item pain questionnaire | | Exercise intervention improved pain intensity and functional ability between groups. | Sample size did not meet power calculation.  Poor exercise compliance. |
| Eggen, 201279  Acceptable | n=257, pregnant women  Age (Mean yrs):  TG1=30.6  CG=30.0  GA (Mean wk)  TG=16.3  CG=16.4  Onset:  Not stated | Group-based exercise (aerobic +  strengthening), information, and home exercises (knee bends, hip stretch, stability)  Group exercise= 1x/wk  60 min  20 wks | CG:  UOBC  Visits  every 4th week to primary care centres | Primary:  PrevLBP  PrevPGP  Secondary:  Morning NSR (11-pt)  Evening NSR (11-pt)  0-no pain  10-pain as bad as it can be  RMDQ  Measurements:  Baseline (prior to 20), 24, 28, 32 and 36 wks | *Within Group*  PrevLBP (% change)  TG: 13.2%  CG: 16.9%  PrevPGP (% change)  TG: 31.9%  CG: 34.2%  Morning NSR:  TG: 1.2 pts  CG: 1.2 pts  Evening NSR:  TG: 1.5 pts  CG: 1.6 pts  RMDQ:  TG: 2.1 pts  CG: 2.2 pts  *Between Group:*  PrevLBP (% change)  TG vs CG:  -3.7%  PrevPGP (% change)  TG vs CG:  -2.3%  RMDQ:  TG vs CG:  -0.1 pts | Morning NRS:  0 pts (-0.9 to 0.9)  Evening NRS:  -1.0 pts (-2.2 to 0.2) | | Group exercise did not reduce the prevalence of pregnancy LBP or PGP. | Possible Type II error with 70% power.  Adverse event not measured.  Imbalance between groups in terms of PGP in previous pregnancy.  Considered women with and without LBP or PGP.  Not enough exercise classes at 1x/week. |
| Haakstad, 201578  Acceptable | n=105, sedentary nulliparous women  Age (Mean yrs):  TG= 31.2  CG= 30.3  GA (Mean wk):  TG= 17.3  CG= 18.0  Onset:  Not stated | Group exercise + home exercise moderate self-imposed physical activity  40 min endurance 20 min strength training and relaxation  2 or 3x/wk  minimum of 12 wks  Home exercise moderate self-imposed physical activity  30 mins on non-group exercise days) | CG:  UOBC  (They were neither encouraged or discouraged from exercising) | Primary:  PrevLBP  PrevPGP  Secondary: Limitation of ADLs and physical activities  Measurements:  Baseline (between 12-14 wks), 36-38 wks (post intervention) and 6-8 wks postpartum | NS differences seen at any point.  *Within Group:*  *Post-intervention*  PGP (% change):  TG: 11.2%  CG:16.9%  LBP (% change):  TG: 16.4%  CG: 10.7%  *Postpartum*  PGP (% change):  TG: -12.9%  CG: 1.5%  LBP (% change):  TG: -10.2  CG: -21.5  *Between group:*  *Post-intervention*  PGP (% change difference):TG vs CG: -5.7%  LBP (% change difference):TG vs CG: 5.7%  *Postpartum*  PGP (% change difference):  TG vs CG= -11.4%  LBP (% change difference):TG vsCG -11.3%  VAS | *No pain scale included* | | No difference in proportion of women with pain between both tx groups and time pts. | Secondary analysis of a study evaluating the effectiveness of exercise on maternal weight gain.  Sample size, was not based on *a priori* power calculations for PGP and LBP outcomes, based on gestational weight gain.  High loss to follow-up at post test.  Low adherence to group exercise classes. |
| ***Support devices*** | | | | | | | | | |
| Kalus, 200885  Acceptable | n=115, pregnant women with LBP or PGP  Age: not reported but stated no differences between groups  GA (Mean wk):  TG=28.2  CG=29.2  Onset:  Not stated | TG:  Belly Bra®  Self-selected duration and frequency of wear for 3 wks | CG:  Tubigrip  Self-selected duration and frequency of wear for 3 wks | Primary:  VAS (0-no pain to 10-worst pain ever in life pts)  ADLs  Likert Scale (1-10 pts):  Sleeping  Sit to stand  Sitting  Walking  Working  Measurements:  Baseline and 3 wks following intervention | *Within Group*  VAS (Mean change):  TG: -1.6 pts, p=0.001  CG: -1.3 pts, p=0.003  Likert Scale: (Mean change)  TG: Range -2.7 to -1.3; all items SS  CG: Range -1.4 to -0.6; all but sitting and walking SS  *Between Group*  Likert Scale: Range -1.4 to -0.5; all SS but sitting | 20.0  (-12.5 to 07.4) | | Both grps associated with a decrease in pain intensity, but no significant difference between groups.  TG more effective than the CG in decreasing pain associated with some ADLs. | The CG garment not formally evaluated.  High loss of participants to follow-up.  Timeline of the intervention (3-wks).  No long-term effects of the study device.  Other tx could be used in the study and control groups |

ADLs = Activities of daily living; am = Morning; Avg = Average; CG = Comparison group; cm = Centimeters; DRI = Disability Rating Index; GA = Gestational age; hrs = Hours; HVLA = High velocity low amplitude thrust; LBP = Low back pain; L/S = Lumbar spine; min = Minute; mins = minutes; mm = Millimeters; mo = Month; mos = Months; MOM = Musculoskeletal and obstetric management; NPRS = numeric pain rating scale; NRS = numerical rating scale; NS = non-significant; OB = Obstetrician; ODI = Oswestry disability index; OMT = Osteopathic manipulative therapy; PGP = Pelvic girdle pain; PFM = Pelvic floor muscles; pm = Evening; Prev = Prevalence; PSFS = Patient specific functional scale; PT = Physiotherapist; pts = points; reps = Repetitions; NET = Neuroemotional technique; NRS = Numeric rating scale; RMDQ = Roland-Morris disability questionnaire; QDQ = Quebec disability questionnaire; RR = SI JT = Sacroiliac joint; SS = Statistically significant; SUT = Sham ultrasound therapy; TENS = Transcutaneous electrical nerve stimulation; TG = Treatment group; tri = Trimester; TVA = Transversus abdominus; tx = Treatment; UBOC = Usual obstetric care; VAS = Visual analog scale; vs = Versus; wk = Week; wks = Weeks; yrs = Years

**Table 8a: Evidence tables for included randomized controlled trials in the treatment of pregnancy-related LBP (Low evidence only)**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Citation and Quality** | **Patient population, Mean Age, Gestational Age, and Mean onset** | **Intervention** | **Comparison Group(s)** | **Dosage** | **Outcome measures and timeline of measures** | **Outcome (Mean change within and between groups)** | **Conclusion** | **Limitations** |
| ***Exercise*** | | | | | | | | |
| Sedaghati, 200758  Low | n= 100, women with or without LBP  Age (Mean yrs):  TG= 23.3  CG= 23.3  GA:  Between 20-22 wks gestation  Onset:  Not stated | TG:  Group exercise (strengthening, stretching and cycling) | CG:  Not stated | 3 x/wk  8 wks | QDQ  Measurements:  Baseline (20-22 wks) and 8 wks later | *Within groups:*  TG= 0.8, p=0.11  CG= 5.8, p=0.00  *Between groups:*  QOD (Mean difference)  At Baseline  CG vs TG= 1.45 p=0.22  QOD (Mean difference)  Posttest  CG vs TG = 6.5, p<0.0001 | Exercise during the 2nd half of pregnancy demonstrated no increase in LBP compared to controls | Group sizes differed  No description of what the pre-test LBP was |
| Dumas, 199563  Low | n=65, sedentary pregnant women  Age (mean yrs)  TG: 28.8  CG: 29.8  GA:  Enrolled after 12 wks  Onset: Not stated | TG:  Group exercise: aerobics, calisthenics, relaxation | CG: no exercise/  sedentary | TG: Group exercise  1 hour  3x/week  Until term | Prev of pain – Prevalence of an episode of moderate or severe pain  Back pain classification scale/Diary (0-5 scale: 0= no pain, 5= intense, incapacitating pain, almost impossible to do anything until it lessens)  Functional limitations (1-3 scale; 1= no difficulties, 2= painful but possible, 3= no possible due to pain) | *Within groups:*  Not reported  *Between groups:*  Prev of pain: no significant difference between the two groups were found at any period of pregnancy  Back pain classification scale:  No significant difference between the two groups was found at any time-period combination showing no reduction of back pain due to exercise.  Functional limitations: No significant differences between the two groups. | Group exercise classes designed according to guidelines had no detectable effect on back pain during pregnancy. | No randomization of groups; divided according to preference |
| Beyaz, 201159  Low | n= 36, healthy pregnant women  Age (Mean yrs):  TG= 24.5  CG= 25.2  GA (Mean wks):  TG= 18.5  CG= 19.5  Onset:  Not reported | TG:  Group exercise + information (including birth prep information at 30 wks) | CG:  Information from their OB clinic | TG:  3x/wk  Encouraged to walk on the days not participating in the class  Until 30-33 wk gestation. After which they could continue until 37 wks | VAS  Measurements:  Baseline (2nd tri) and post-intervention (30-33rd wk) | *Within groups:*  VAS (Raw data not reported)  TG: decreased, p<0.001  CG: increased, p=0.0001  *Between groups:*  Not reported | Exercise program was effective at preventing LBP in pregnant women | Small sample size  Unequal group sizes  No randomization process for groups; participants assigned to groups based on availability  Occupational demands significantly different (heavier) in TG than CG |
| Garshasbi, 200560  Low | n=212, pregnant women  Age (Mean yrs):  TG=26  CG=26  GA:  Enrolled 17-22 wks  Onset:  Not stated | TG:  Group exercise  (strengthening specific muscles) | CG:  No exercise | TG:  3x/wk  12 wks  60 min/ session | KEBK\* | *Within group:*  KEBK (Mean change)  TG: 6.88, p<0.001  CG: 1.37, p<0.001  *Between groups:*  Following intervention  KEBK  CG vs TG, p= 0.006 | Exercise was effective in reducing low back pain intensity. | No power calculation  Outcome measure is limited and was modified  No mention of attrition rate  No intention to treat analysis  No mention of participant blinding to group allocation |
| Figueira, 201461  Low | n= 40, pregnant women with or without LBP  Age (Mean yrs):  TG=25  CG=26  GA (Mean wks):  TG=23.9  CG=23.4  Onset:  Not stated | TG:  Group exercise (sessions of static flexibilizing) | CG:  UOBC | TG:  2x/wk  45 min/ session    18 sessions. | VAS | *Within group*  With LBP  VAS (% change)  TG: -56.4, p=<0.005  CG: 2.9, p=0.34  *Between groups*  VAS (Mean change)  Post-test  CG vs TG, p=<0.005 | Exercise was effective in reducing low back pain intensity in comparison to conventional prenatal tx | No power calculation  No sham or no tx comparison group  Simple random sampling  No blinding  No mention of attrition |
| Kihlstrand, 199962  Low | n= 258, pregnant women with or without back/LBP  Age (Mean yrs):  TG= 28  CG= 29  GA:  Enrollment could begin before the 19th wk  Onset:  Not reported | TG=  Group exercise (water gymnastics) | CG=  No tx | Water gymnastics:  10 classes  12-15 women  60 min: 30 min of physical training and 30 min of relaxation exercises | worstVAS (10 cm)  mildestVAS (10 cm)  nowVAS (10 cm)  Measurements:  18 and 34 wks and 7 days postpartum  Note: nowVAS was recorded every day from 18 wks gestation until labour | *Within group:*  Not reported  *Between group:*  nowVAS  At 18 wks  CG vs TG, p= NS  Between 33-38 wks  CG vs TG, SS lower for TG, but p-value not given  worstVAS  At 18 wks  CG vs TG, p=0.893  At 34 wks  CG vs TG, p=0.230  7 days postpartum  CG vs TG, p=0.034 | Water gymnastics during the 2nd half of pregnancy significantly reduces the intensity of back/LBP | Randomization concerns  Poor blinding  Differences between groups  No mention of reason for dropouts. |

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| ***Support devices*** | | | | | | | |  |
| Carr, 200367  Low | n=40, pregnant women, self-report of LBP over the previous wk  Age (Mean yrs):  GA (Mean wks):  TG= 27.6  CG= 27.3  Onset:  In the last week | TG=  Loving Comfort back support | CG=  No tx until after the TG finished wearing the belt | TG: wear support belt for 2 wks, during waking hrs | NRS (0-10) for pain  NRS (0-10) for function | *Within group:*  Average Pain (Mean Difference)  TG:-1.08, p=NS  CG:-1.38, p=NS  Family Functional Activities (Mean Difference)  TG: 0.99, p=0.01  CG: -0.87 p=0.01  *Between group:*  Average Pain (Mean Difference)  TG vs CG: 0.3, p=NS  Family Functional Activities (Mean Difference)  TG vs CG: 0.49 | The use of a maternity belt may reduce pain scores and lessen the effects of pregnancy-related LBP | Pilot study  Lack of randomization  Small group size  Experience of the TG |
| Thomas, 198968  Low | n= 92, pregnant women, with or without backache  Age (Mean yrs):  Not reported  GA (Mean wk):  TG=36  CG=36  Onset:  Varied throughout pregnancy | TG=  Ozzlo pillow  Patients crossed over in the second wk | CG=  Regular pillow  Patients crossed over in the second wk | Each participant took either the TG or CG pillow for the 1st wk  Then switched pillows for the 2nd wk | amVAS (100 mm)  pmVAS (100 mm)  Measurements:  Each day and night of the week | *Within group:*  Not reported  *Between group:*  amVAS (Mean difference)  TG vs CG= -4, p=0.04  pmVAS  TG vs CG= -6, p=0.005 | Supporting the abdomen in the lateral recumbent position may benefit women in late pregnancy  Using the specially designed pillow may be of greater help than a normal pillow | No baseline VAS measures were obtained  Age demographic not reported  Short duration of the study |

am = morning; CG = Comparison group; GA = Gestational age; hrs = Hours; KEBK = questionnaire for low back pain intensity changed according to Iranian culture and behaviors; LBP = Low back pain; NRS = Numeric rating scale; OB = Obstetrics; ODI = Oswestry disability index; pm = evening; QDQ = Quebec disability questionnaire; SS = Statistically significant; TG = Treatment group; tx = treatment; UOBC = Usual obstetric care; VAS = Visual analog scale; vs = Versus; wk = Week; wks = Weeks; yrs = Years

**Table 8b: Evidence tables for included randomized controlled trials in the treatment of pregnancy-related PGP (Low evidence only)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Citation and Quality** | **Patient population, Mean Age, Gestational Age, and Mean onset** | **Intervention** | **Comparison Group(s)** | **Dosage** | **Outcome measures and timeline of measures** | **Outcome (Mean change within and between groups)** | **Conclusion** | **Limitations** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Support devices*** | | | | | | | | |
| Kordi, 201372  Low | n=105, pregnant women with PGP    Age:  TG1=26.5  TG2=28.3  CG= 25.3  GA (Mean wks):  TG1=24.7  TG2= 26.5  CG=25.5  Onset:  During pregnancy | TG1:  Exercise=  home-based exercise program + information  TG2:  Non-rigid lumbopelvic belt + information | CG:  Information | TG1:  Aerobic exercise=  64-76% HRmax  25 min/ session  Stretching  10-20 sec holds  3-5 x/ session  2x/day,  Strengthening exercise:  3-10 sec  3-5x/ session  2x/day  All exercises 3x/wk for 6 wks  TG2:  Wear belt during the course of the study, could remove for sleep | Primary:  ODI (Persian version)  VAS (100 mm)  Measurement:  Baseline, 3rd + 6th wk | *Within group:*  VAS  TG1: -27.1  TG2: -53.4  CG: -5.8  ODI  TG1: -14.0  TG2: -20.5  CG: -6.6  *Between groups*  VAS  TG1 vs CG: -21.3, p<0.001  TG2 vs CG: -47.6, p<0.001  TG2 vs TG1: -26.3, p<0.001  ODI  TG1 vs CG: -7.4, p<0.001  TG2 vs CG: -13.9, p<0.001  TG2 vs TG1: -6.5, p=0.008 | Short-term lumbopelvic belt + information in t of pregnant women with PGP is superior to exercise + information or information alone.  Exercise plus information also out performed the control group to a statistically significant degree. | Lack of long-term follow-up.  Groups were not equal in VAS and ODI at baseline  Only 20-32 weeks pregnant at baseline included |

CG = Comparison group; GA = Gestational age; hrs = Hours; OB = Obstetrics; ODI = Oswestry Disability Index; PGP = Pelvic girdle pain; SS = Statistically significant; TG = Treatment group; UOBC = Usual obstetric care; VAS = Visual analog scale; vs = Versus; wk = Week; wks = Weeks; yrs = Years

**Table 8c: Evidence tables for included randomized controlled trials and cohort studies\* in the treatment of**

**pregnancy-related LBP and/or PGP (Low evidence only)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Citation and Quality** | **Patient population, Mean Age, Gestational Age, and Mean onset** | **Intervention** | **Comparison Group(s)** | **Dosage** | **Outcome measures and timeline of measures** | **Outcome (Mean change within and between groups)** | **Conclusion** | **Limitations** |

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| ***Exercise*** | | | | | | | | |
| Noren, 199784\*  Low | n= 135, pregnant women with LBP and/or PGP  Age (Mean yrs):  Not reported. But stated no significant difference between intervention and control group from another clinic  GA (Mean wk)  TG= 26  CG=26  Onset:  Wk 18 | TG:  Individualized program of information + exercise | CG:  Information | 5 visits | VAS max  VAS min  VAS present | *Within group:*  VAS max @ 36 wks (Mean difference)  VAS max = -1.1, p<0.05  VAS min  Values not reported, p=NS  Vas present  Values not reported, p=NS  *Between Group:*  Not reported | Sick leave for LBP and PGP was reduced with an individualized program of information and exercise. | Assessors were not blinded  Study was not randomized at 1 clinic  2 different assessors; 1 for the TG and 1 for CG |
| Mahishale, 201482  Low | n= 210, pregnant women with PGP and LBP  Age:  Between18-40; age was well matched between groups. No specific numbers reported.  GA: 16-34 wks; GA was well matched between groups. No specific numbers reported.  Onset:  Not stated | TG:  Specific exercise protocol/program based on pain presentation:  TG1: LP  TG2: SJP  TG3: SPP | CG:  Non-specific exercise program based on  pain presentation:  CG1: LJP  CG2: SJP  CG3: SPP | 5 consecutive days  30 min/ sessions | VAS  MODQ  Measurements:  1st day pre-intervention and 5 days post-intervention | *Within Group:*  Pre vs Posttest VAS  TG1, TG2, TG3, p=0.0001  CG1, CG2, CG3, p=0.0001  MODQ  TG1, TG2, TG3, p=0.0001  CG1, CG2, CG3, p=0.0001  *Between groups:*  Posttest  VAS  C1 vs TG1, p=0.0001  C2 vs TG2, p=0.285  C3 vs TG3, p=0.0001  MODQ  C1 vs TG1, p=0.0001  C2 vs TG2, p=0.974  C3 vs TG3, p=0.0001 | Specific tailored exercise protocol was more beneficial for lumbar pain and symphysis pubis pain.  There was no additional benefit for sacroiliac joint pain. | Convenience sampling.  No power calculation.  No intention to treat analysis.  Short-term follow-up. |
| Ostgaard, 199483  Low | n=407, women with LBP or PGP during pregnancy  Age:  No statistically significant differences existed among groups.  Specifics regarding baseline characteristics not reported.  GA:  TG1: before the 20th wk of pregnancy  TG2: between 18-32 wks  Onset: before 18th week of pregnancy | TG1:  Back school education (group)  Training program: anatomy, posture physiology, lifting and work technique, muscle and relaxation training  Sacroiliac belt (if needed)  TG2:  Back school education (individual)  Training program (see above)  Home exercises: individualized  Sacroiliac belt (if needed) | CG:  UOBC | TG1:  Group class (5-8 participants)  2 x 45 min  Given before 20-wks gestation  TG2:  Individualized sessions: 5x30 min  Between 18-32 wks gestation | VAS  Sick leave  Measurements: Baseline (before 18 wk gestation), 36 wks gestation, 8 wks postpartum | *Within group:*  VAS  Not reported  Sick leave  Less common in TG2  *Between Group:*  VAS  Did not differ among the groups during pregnancy  CG vs TG2 at 8-weeks post-partum, p=0.05 in the LBP group only  Sick leave  CG vs TG2, p<0.05  CG vs TG1, NS  \*\*no specific numbers were presented in the paper to draw mean changes.\*\* | Back pain problems can be reduced by individual education programs starting in early pregnancy  However, there was no significant difference between groups in pain intensity reduction during pregnancy. | No baseline information  Poor randomization method  No power calculation  No mention of concealment method |
| ***Support devices*** | | | | | | | | |
| Kaplan, 201686  Low | n=71, pregnant women with LBP and/or PGP  Age (Mean yrs):  TG=24  CG=25  GA:  TG=21.8 wks  CG=21.9 wks  Onset:  Not stated. | TG:  KT therapy  + Paracetamol (1500 mg/day) | CG:  Paracetamol (1500mg/day for 5 days) | 5 days | VAS rest (10 cm)  VAS motion (10 cm)  RMDQ (Turkish version)  Measurements:  Baseline and 5 days | *Within group:*  Baseline to 5th day  VAS rest (Mean change):  TG: 6.21 (2.06), p<0.001  CG: 3.98 (1.48), p<0.001  VAS motion (Mean change):  TG: 6.37 (1.96), p<0.001  CG: 4.21 (1.71), p<0.001  RMDQ (% improvement):  TG: 70.30 (22.78), p<0.001  CG: 48.45 (14.32), p<0.001  *Between groups:*  TG significantly superior in all outcome measures compared to controls.  p= <0.001  VAS rest (Mean change):  CG vs TG: -2.23, p<0.001  CG: 3.98 (1.48), p<0.001  VAS motion (Mean change):  CG vs TG: -2.16, p<0.001  RMDQ (% improvement):  CG vs TG: -21.85, p<0.001 | Kinesio tape had additional benefit in comparison to paracetamol therapy alone.  No serious adverse events with exception of a few local allergic reactions from the Kinesio tape. | No mention of randomization and allocation methods.  No power calculation and no intention to treat analysis.  Short-term.  No sham taping application. |
| ***Physiotherapy*** | | | | | | | | |
| Wedenberg, 200087  Low | n= 60, pregnant women with LBP and/or PGP  Age=  TG1: 28.4  TG2: 29.4  GA=  TG1: 24.2  TG2: 24.2 | TG1: Acupuncture  TG2: Individualized physiotherapy according to pre-tx evaluation | CG;  N/A | TG1:  3x/wk during first 2 wks, then 2x/wk, totaling 10 tx  for 1 mo  30 min  TG2:  1-2 x/wk, totaling 10 tx  6-8 wks  50 min | Before tx  amVAS (0-10)  pmVAS (0-10)  During tx  amVAS (0-10)  pmVAS (0-10)  After tx  amVAS (0-10)  pmVAS (0-10)  DRI  Measurements:  Before, during and after (within 1 wk) intervention | *Within group:*  Before and during tx:  VAS  Not reported  After tx  amVAS  TG1: -2.5, p<0.01  TG2: -1.4, p=NS  pmVAS  TG1: -5.7, p<0.01  TG2: -2.1, p<0.01  DRI:  Before and during tx:  Values not reported  After tx:  Values not reported  TG1: Significantly less following tx except “dressing/undressing”  TG2: Not stated  *Between group:*  Before tx  VAS  Not reported  DRI  TG1 and TG2, NS  After tx  am VAS TG1 p=0.02  pm VAS TG1 p<0.01  DRI  Values not reported  But TG1 significantly less than corresponding values of TG2 after tv, p value not reported | Acupuncture  may relieve pain and disability in LBP.  Physiotherapy did not relieve pain to same extent, but halted worsening, did not diminish disability | Small study  No true control group  High number of dropout in physiotherapy group (none in acupuncture group)  Demonstrates short-term effects only |

am = morning; CG = Comparison group; DRI = Disability rating index; GA = Gestational age; hrs = Hours; KT = Kinesio tape; LBP = Low back pain; LJP = Lumbar joint pain; mg = Milligrams; min = Minute; MODQ- Modified Oswestry disability questionnaire; NRS = Numeric rating scale; NS = Non-signficant; OB = Obstetrics; ODI = Oswestry disability index; pm = Evening; QDQ = Quebec disability questionnaire; RMDQ = Roland-Morris disability questionnaire; SJP = Sacroiliac joint pain; SPP = Symphysis pubis pain; SS = Statistically significant; TG = Treatment group; tx = Treatment; UOBC = Usual obstetric care; VAS = Visual analog scale; vs = Versus; wk = Week; wks = Weeks; yrs = Years

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