

Evidence Portfolio – Pregnancy and Postpartum Work Group, Question 4

What is the relationship between physical activity, affect, anxiety, and depression during pregnancy and postpartum (up to one year)?

- a. What dose of physical activity is associated with the reported quantitative benefit or risk?
- b. Is there a dose-response relationship? If yes, what is the shape of the relationship?
- c. Does the relationship vary by age, ethnicity, socio-economic status, or weight status?

Sources of Evidence: Existing Systematic Reviews and Meta-Analyses

Conclusion Statements and Grades

AFFECT DURING PREGNANCY OR THE POSTPARTUM PERIOD

Insufficient evidence is available to determine whether a relationship exists between physical activity and affect during pregnancy and the postpartum period. **PAGAC Grade: Not assignable.**

Insufficient evidence is available to determine whether a specific dose of physical activity is associated with affect during pregnancy and the postpartum period. **PAGAC Grade: Not assignable.**

Insufficient evidence is available to determine whether a dose-response relationship exists between physical activity and affect during pregnancy and the postpartum period. **PAGAC Grade: Not assignable.**

Insufficient evidence is available to determine whether the relationship between physical activity and affect varies by age, race/ethnicity, socioeconomic status, or weight status. **PAGAC Grade: Not assignable.**

ANXIETY DURING PREGNANCY

Limited evidence suggests that higher levels of physical activity are associated with reduced symptoms of anxiety during pregnancy. **PAGAC Grade: Limited.**

Insufficient evidence is available to determine the dose of physical activity that is associated with reduced symptoms of anxiety during pregnancy. **PAGAC Grade: Not assignable.**

Insufficient evidence is available to determine whether a dose-response relationship exists between physical activity and reduced symptoms of anxiety during pregnancy. **PAGAC Grade: Not assignable.**

Insufficient evidence is available to determine whether the relationship between physical activity and symptoms of anxiety during pregnancy varies by age, race/ethnicity, socioeconomic status, or weight status. **PAGAC Grade: Not assignable.**

ANXIETY DURING THE POSTPARTUM PERIOD

Insufficient evidence is available to determine whether a relationship exists between physical activity and symptoms of anxiety during the postpartum period. **PAGAC Grade: Not assignable.**

Insufficient evidence is available to determine whether a specific dose of physical activity is associated with symptoms of anxiety during postpartum. **PAGAC Grade: Not assignable.**

Insufficient evidence is available to determine whether a dose-response relationship exists between physical activity and symptoms of anxiety during postpartum. **PAGAC Grade: Not assignable.**

Insufficient evidence is available to determine whether the relationship between physical activity and symptoms of anxiety during postpartum varies by age, race/ethnicity, socioeconomic status, or weight status. **PAGAC Not assignable.**

DEPRESSION DURING PREGNANCY

Limited evidence suggests that higher levels of physical activity are associated with reduced symptoms of depression during pregnancy. **PAGAC Grade: Limited.**

Insufficient evidence is available to determine whether a specific dose of physical activity is associated with reduced symptoms of depression during pregnancy. **PAGAC Grade: Not assignable.**

Insufficient evidence is available to determine whether a dose-response relationship exists between physical activity and reduced symptoms of depression during pregnancy. **PAGAC Grade: Not assignable.**

Insufficient evidence is available to determine whether the relationship between physical activity and symptoms of depression during pregnancy varies by age, race/ethnicity, socioeconomic status, or weight status. **PAGAC Grade: Not assignable.**

DEPRESSION DURING POSTPARTUM

Strong evidence demonstrates an inverse relationship between physical activity and reduced symptoms of depression during postpartum. **PAGAC Grade: Strong.**

Insufficient evidence is available to determine whether a specific dose of physical activity is associated with reduced symptoms of depression during the postpartum period. **PAGAC Grade: Not assignable.**

Insufficient evidence is available to determine whether there is a dose-response relationship between physical activity and reduced symptoms of depression during postpartum. **PAGAC Grade: Not assignable.**

Insufficient evidence is available to determine whether the relationship between physical activity and symptoms of depression during postpartum varies by age, race/ethnicity, socioeconomic status, or weight status. **PAGAC Not assignable.**

Description of the Evidence

To address its research questions, the Pregnancy and Postpartum Work Group conducted one search for systematic reviews, meta-analyses, pooled analyses, and reports on preeclampsia and eclampsia and chose to rely on 7 searches conducted by PAGAC subcommittees that were considered to have the potential to provide pertinent information on pregnancy and postpartum. The 7 searches conducted by subcommittees included:

1. Cardiometabolic Health and Weight Management Q1: What is the relationship between physical activity and prevention of weight gain?

Pregnancy and Postpartum Work Group Q4. What is the relationship between physical activity, affect, anxiety, and depression during pregnancy and postpartum (up to one year)?

2. Cardiometabolic Health and Weight Management Q2: In people with normal blood pressure or pre-hypertension, what is the relationship between physical activity and blood pressure?
3. Cardiometabolic Health and Weight Management Q3: In adults without diabetes, what is the relationship between physical activity and type 2 diabetes?
4. Brain Health Q2: What is the relationship between physical activity and quality of life?
5. Brain Health Q3: What is the relationship between physical activity and (1) affect, (2) anxiety, and (3) depressed mood and depression?
6. Brain Health Q4: What is the relationship between physical activity and sleep?
7. Aging Q2: What is the relationship between physical activity and physical function?

Additional searches for systematic reviews, meta-analyses, pooled analyses, reports, or original research were not conducted based on the a priori decision to focus on existing reviews.

ANXIETY AND DEPRESSION DURING PREGNANCY

Existing Systematic Reviews

Overview

Two systematic reviews^{1,2} that examined the association between physical activity and affect, anxiety, and depression during pregnancy were included. The reviews were published in 2016 and 2011.

The reviews included 13¹ and 6² studies and covered a timeframe from inception to 2013 and from 1985 to 2010, respectively.

Exposures

One review¹ assessed the effects of yoga, while the other² assessed the effects of different types of exercise during pregnancy.

Outcomes

Both reviews examined depression and anxiety during pregnancy.

DEPRESSION DURING POSTPARTUM

Existing Systematic Review and Meta-Analyses

Overview

Two meta-analyses^{3,4} and 1 systematic review⁵ that examined the association between physical activity and affect, anxiety, and depression during the postpartum period were included. The reviews were published in 2013 and 2017.

The meta-analyses included 16³ and 12⁴ studies and covered a timeframe from inception to 2016 and from 1990 to 2016, respectively.

The systematic review⁵ included 17 studies and covered a timeframe from 1991 to 2012.

Exposures

One meta-analysis examined the effect of structured exercise interventions of light-to-moderate intensity,³ while the other examined any type of physical activity/exercise intervention performed during pregnancy and the postpartum period.⁴ The systematic review⁵ examined leisure-time and occupational physical activity as well as sedentary behavior.

Outcomes

All included reviews examined postpartum depression.

Populations Analyzed

The table below lists the populations analyzed in each article.

Table 1. Populations Analyzed by All Sources of Evidence

	Sex	Pregnancy	Chronic Conditions
McCurdy, 2017	Female	Postpartum	Postpartum depression
Poyatos-Leon, 2017	Female	Pregnant, postpartum	Postpartum depression
Sheffield, 2016	Female	Pregnant	
Shivakumar, 2011	Female	Pregnant	
Teychenne, 2013	Female	Pregnant, postpartum	Postpartum depression

Supporting Evidence

Existing Systematic Reviews and Meta-Analyses

Table 2. Existing Systematic Reviews and Meta-Analyses Individual Evidence Summary Tables

Postpartum	
Meta-Analysis	
Citation: McCurdy AP, Boule NG, Sivak A, Davenport MH. Effects of exercise on mild-to-moderate depressive symptoms in the postpartum period: a meta-analysis. <i>Obstet Gynecol.</i> 2017;129(6):1087–1097. doi:10.1097/AOG.0000000000002053.	
Purpose: To examine the influence of exercise on the treatment and prevention of depression in the postpartum period and on depressive symptoms.	Abstract: OBJECTIVE: To examine the influence of exercise on depressive symptoms and the prevalence of depression in the postpartum period. DATA SOURCES: A structured search of MEDLINE, EMBASE, CINAHL, Sport Discus, Ovid's All EBM Reviews, and ClinicalTrials.gov databases was performed with dates from the beginning of the databases until June 16, 2016. The search combined keywords and MeSH-like terms including, but not limited to, "exercise," "postpartum," "depression," and "randomized controlled trial." METHODS OF STUDY SELECTION: Randomized controlled trials comparing postpartum exercise (structured, planned, repetitive physical activity) with the standard care for which outcomes assessing depressive symptoms or depressive episodes (as defined by trial authors) were assessed. Trials were identified as prevention trials (women from the general postpartum population) or treatment trials (women were classified as having depression by the trial authors). Effect sizes with 95% confidence intervals (CIs) were calculated using Hedges' g method and standardized mean differences in postintervention depression outcomes were pooled using a random-effects model. TABULATION, INTEGRATION, AND RESULTS: Across all 16 trials (1,327 women), the pooled standardized mean difference was -0.34 (95% CI -0.50 to -0.19, I=37%), suggesting a small effect of exercise among all postpartum women on depressive symptoms. Among the 10 treatment trials, a moderate effect size of exercise on depressive symptoms was found (standardized mean difference -0.48, 95% CI -0.73 to -0.22, I=42%). In six prevention trials, a small effect (standardized mean difference -0.22, 95% CI -0.36 to -0.08, I=2%) was found. In women with depression preintervention, exercise increased the odds of resolving depression postintervention by 54% (odds ratio 0.46, Mantel-Haenszel method, 95% CI 0.25-0.84, I=0%). The trials included in this meta-analysis were small and some had methodologic limitations. CONCLUSION: Light-to-moderate intensity aerobic exercise improves mild-to-moderate depressive symptoms and increases the likelihood that mild-to-moderate depression will resolve.
Timeframe: Inception–June 2016	
Total # of Studies: 16	
Exposure Definition: PA such as aerobic exercise, resistance training, stretching, or a combination of modalities. The frequency of the prescribed exercise ranged from 1 to 5 times per week for 30–60 minutes per session. The intervention lasted between 6 weeks and 12 months. When reported, intensity was classified as light to moderate.	
Measures Steps: No Measures Bouts: No Examines HIIT: No	
Outcomes Addressed: Depressive symptoms: the Edinburgh Postnatal Depression Scale, Center for Epidemiological Studies Depression Scale, Hamilton Depression Rating Scale scores, Structured Clinical Interview for DSM disorders, or the International Statistical Classification of Diseases and Related Health Problems. Examine Cardiorespiratory Fitness as Outcome: No	

Populations Analyzed: Female,
Postpartum, Post-partum
Depression

Author-Stated Funding Source: Not reported.

Postpartum

Meta-Analysis

Citation: Poyatos-Leon R, Garcia-Hermoso A, Sanabria-Martinez G, et al. Effects of exercise-based interventions on postpartum depression: a meta-analysis of randomized controlled trials. *Birth*. 2017;44(3):200-208. doi:10.1111/birt.12294.

Purpose: To assess the effectiveness of PA interventions during pregnancy and the postpartum period on preventing and controlling postpartum depressive symptoms.

Timeframe: 1990–May 2016

Total # of Studies: 12

Exposure Definition: A variety of PA interventions, including stretching and breathing exercises, a walking program, cardiovascular exercises, mixed cardiovascular and strength exercises, pilates and yoga exercises, and home-based programs. Session frequency varied from 1 to 5 days per week and intensity levels included low, moderate, or moderate to high.

Measures Steps: No

Measures Bouts: No

Examines HIIT: No

Outcomes Addressed: Depressive symptoms: Edinburgh Postnatal Depression Score or the Beck Depression Inventory.

Examine Cardiorespiratory Fitness as Outcome: No

Populations Analyzed: Female, Pregnant, Postpartum, Post-partum depression

Abstract: BACKGROUND: There is inconsistent evidence about the effect of physical activity on the prevention and treatment of depression during the postnatal period. The aim of this meta-analysis was to determine the effect of physical activity interventions during pregnancy and the postpartum period for controlling postpartum depressive symptoms. METHODS: We systematically searched Cochrane Library Plus, Science Direct, EMBASE, CINAHL, PubMed, Web of Science, and Scopus, from January 1990 to May 2016, for randomized or nonrandomized controlled trials addressing the effect of physical activity on postpartum depression. The inverse variance-weighted method was used to compute pooled estimates of effect size and respective 95% confidence intervals (95% CI) for physical activity intervention on postpartum depression. Subgroup analyses were performed comparing women with and without postpartum depressive symptoms according to specific scales measuring this construct. Meta-regression and sensitivity analysis were computed to evaluate heterogeneity. RESULTS: Twelve studies were included in the meta-analysis. Effect size for the relationship between physical activity interventions during pregnancy and the postpartum period on postpartum depressive symptoms was 0.41 (95% CI 0.28-0.54). Heterogeneity was $I^2 = 33.1\%$ ($P = .117$). When subgroup analyses were done, pooled effect sizes were 0.67 (95% CI 0.44-0.90) for mothers who met postpartum depressive symptoms criteria at baseline based on specific scales, and 0.29 (95% CI 0.14-0.45) for mothers who did not meet those depressive symptoms criteria at baseline. CONCLUSION: Physical exercise during pregnancy and the postpartum period is a safe strategy to achieve better psychological well-being and to reduce postpartum depressive symptoms.

Author-Stated Funding Source: Not reported.

Pregnancy

Systematic Review

Citation: Sheffield KM, Woods-Giscombe CL. Efficacy, feasibility, and acceptability of perinatal yoga on women's mental health and well-being: a systematic literature review. *J Holist Nurs.* 2016;34(1):64–79. doi:10.1177/0898010115577976.

Purpose: To examine existing empirical literature on yoga interventions and yoga's effects on the health and well-being of pregnant women.

Timeframe: Inception–2013

Total # of Studies: 13

Exposure Definition: Yoga, alone or in combination with tai chi, exercise, and/or pilates. Length of intervention varied from 6 to 16 weeks; time spent ranged from 20 to 120 minutes.

Measures Steps: No

Measures Bouts: No

Examines HIIT: No

Outcomes Addressed: Depression and anxiety: various questionnaires, including the Center for Epidemiologic Studies-Depression Scale (CES-D), Edinburgh Postnatal Depression Scale, profile of mood states, Beck Depression Inventory (BDI-II), and Hospital Anxiety Depression Scale. Stress: Perceived Stress Scale and Pregnancy Experiences Questionnaire. Various birth outcomes including neonatal birth weights; labour pain, maternal–fetal attachment.

Examine Cardiorespiratory Fitness as Outcome: No

Abstract: INTRODUCTION: Perinatal major depressive disorder affects 20% of women, while perinatal anxiety affects 10% of women. Although pharmacological treatment has shown effectiveness, many pregnant women are concerned about potential adverse effects on the fetus, maternal-infant bonding, and child development.

Approximately 38% of American adults use complementary and alternative medicine, including yoga and other mind-body strategies. Although complementary and alternative medicine has been less studied in the perinatal population, it potentially offers women and their providers alternatives to traditional medication for treatment of perinatal depression and anxiety. Thus, the purpose of this systematic review was to examine existing empirical literature on yoga and its effects on women's health and well-being during the perinatal period. METHOD: Following PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines for systemic literature reviews, literature searches using relevant search terms were performed in four major electronic databases: CINAHL, PubMed, PsycINFO, and EMBASE. Thirteen publications met inclusion criteria. RESULTS: Results indicated that yoga interventions are generally effective in reducing anxiety and depression in pregnant women. DISCUSSION: The use of yoga in the perinatal period shows promise in improving mental health and well-being for women and infants. This review can inform future yoga intervention studies and clinical practice with the perinatal population.

Populations Analyzed: Female, Pregnant

Author-Stated Funding Source: Interventions for Preventing & Managing Chronic Illness, Robert Wood Johnson Foundation Nurse Faculty Scholars Program

Pregnancy	
Systematic Review	
Citation: Shivakumar G, Brandon AR, Snell PG, et al. Antenatal depression: a rationale for studying exercise. <i>Depress Anxiety</i> . 2011;28(3):234–242. doi:10.1002/da.20777.	
Purpose: To understand safety of exercise during pregnancy; identify findings regarding the impact of exercise on obstetric outcomes; investigate potential mood benefits of exercise upon pregnant women; and provide a scientific rationale for studying exercise as an intervention for Major Depressive Disorder during pregnancy.	Abstract: BACKGROUND: Major depressive disorder (MDD) in pregnancy or antenatal depression poses unique treatment challenges and has serious consequences for mothers, unborn babies, and families when untreated. This review presents current knowledge on exercise during pregnancy, antidepressant effects of exercise, and the rationale for the specific study of exercise for antenatal depression. METHOD: A systematic literature review was performed using English language articles published in Medline, PsycINFO, CINAHL, and the Cochrane Library from 1985 to January 2010.
Timeframe: 1985–January 2010	RESULTS: There is a broad literature supporting the antidepressant effects of exercise, but a paucity of studies specifically for antenatal depression. A small number of observational studies have reported that regular physical activities improve self-esteem and reduce symptoms of anxiety and depression during pregnancy. To date, there have not been randomized controlled studies of exercise for the treatment of MDD in pregnant women. CONCLUSIONS: Systematic studies are needed to assess exercise as a treatment alternative for MDD during pregnancy. In consideration of the benefits of exercise for the mother and baby, and the burden of depression, studies are needed to determine the role of exercise for pregnant women with depression.
Total # of Studies: 6	
Exposure Definition: Various type, intensities, and duration of PA, such as aerobic or non-aerobic organized exercise programs.	
Measures Steps: No Measures Bouts: No Examines HIIT: No	
Outcomes Addressed: Self-esteem. Depressive symptoms. Well-being. Anxiety. Examine Cardiorespiratory Fitness as Outcome: No	
Populations Analyzed: Female, Pregnant	Author-Stated Funding Source: National Institutes of Health, National Institute of Mental Health, GlaxoSmithKline, Eli Lilly, Forest, Pam Lab.

Postpartum	
Systematic Review	
Citation: Teychenne M, York R. Physical activity, sedentary behavior, and postnatal depressive symptoms: a review. <i>Am J Prev Med.</i> 2013;45(2):217–227. doi:10.1016/j.amepre.2013.04.004.	
Purpose: To systematically examine the evidence investigating the association between PA, sedentary behavior, and post-natal depressive symptoms, focusing particularly on the dose and domain in which these behaviors are undertaken.	Abstract: CONTEXT: Postnatal depression is highly prevalent in mothers. Although physical activity has been found to reduce the risk of depression in the general population, little is known regarding its link with postnatal depression. This review examined original research investigating the relationship between physical activity and sedentary behavior dose (frequency, intensity, and duration) and domain, and postnatal depressive symptoms. EVIDENCE ACQUISITION: A systematic search for original research investigating the relationship between physical activity and sedentary behavior dose and domain, and postnatal depressive symptoms, was performed using several electronic databases in early 2012. A total of ten observational and seven intervention studies were included. EVIDENCE SYNTHESIS: Most studies (one cross-sectional, two longitudinal, and six intervention studies) found an inverse association between postpartum leisure-time physical activity (LTPA) and postnatal depressive symptoms. One longitudinal study found that occupational physical activity was positively associated with postnatal depressive symptoms. There was inconclusive evidence to suggest an optimal dose of postpartum physical activity for reducing postnatal depressive symptoms. Two longitudinal studies found an inverse association between antenatal LTPA and presence of postnatal depressive symptoms. One of two studies that investigated sedentary behavior found a positive cross-sectional association between sedentary behavior and presence of postnatal depressive symptoms. CONCLUSIONS: Although studies are limited, on balance, LTPA prior to, during, and after pregnancy may be important for reducing the risk of postnatal depression. Further research is required to determine the optimal dose and domain of physical activity for reducing postnatal depressive symptoms as well as to examine the link between sedentary behavior and postnatal depressive symptoms.
Timeframe: 1991–2012	
Total # of Studies: 17	
Exposure Definition: Exercise performed was mainly leisure-time PA, such as moderate-to-vigorous or moderate intensity activities. Sedentary behavior (such as television viewing or eating) was also evaluated. Dose (frequency, duration, intensity) and domain of PA were assessed.	
Measures Steps: No Measures Bouts: No Examines HIIT: No	
Outcomes Addressed: Post-natal depressive symptoms: various questionnaires, including Edinburgh Postnatal Depression Scale (EPDS), the Beck Depression Inventory (BDI), and the Center for Epidemiologic Studies Depression Scale (CES-D). Examine Cardiorespiratory Fitness as Outcome: No	
Populations Analyzed: Female, Pregnant, Postpartum, Post-partum Depression	Author-Stated Funding Source: Not reported.

Table 3. Existing Systematic Reviews and Meta-Analyses Quality Assessment Chart

	McCurdy, 2017	Poyatos-Leon, 2017	Sheffield, 2016	Shivakumar, 2011	Teychenne, 2013
Review questions and inclusion/exclusion criteria delineated prior to executing search strategy.	Yes	Yes	Yes	No	Yes
Population variables defined and considered in methods.	Yes	No	No	No	No
Comprehensive literature search performed.	Yes	Yes	Yes	Partially Yes	Yes
Duplicate study selection and data extraction performed.	Yes	No	No	No	No
Search strategy clearly described.	Yes	Yes	Yes	Yes	Yes
Relevant grey literature included in review.	Yes	No	No	Yes	No
List of studies (included and excluded) provided.	No	No	No	No	Yes
Characteristics of included studies provided.	Yes	Yes	Yes	Yes	Yes
FITT defined and examined in relation to outcome effect sizes.	No	Yes	N/A	N/A	N/A
Scientific quality (risk of bias) of included studies assessed and documented.	Yes	Yes	Partially Yes	No	Yes
Results depended on study quality, either overall, or in interaction with moderators.	No	Yes	No	N/A	Yes
Scientific quality used appropriately in formulating conclusions.	Yes	Yes	Yes	N/A	Yes
Data appropriately synthesized and if applicable, heterogeneity assessed.	Yes	Yes	N/A	N/A	N/A
Effect size index chosen justified, statistically.	Yes	Yes	N/A	N/A	N/A
Individual-level meta-analysis used.	No	No	N/A	N/A	N/A
Practical recommendations clearly addressed.	Yes	Yes	Yes	Yes	Yes
Likelihood of publication bias assessed.	No	Yes	No	No	Yes
Conflict of interest disclosed.	No	No	No	No	No

Appendices

Appendix A: Analytical Framework

Topic Area

Pregnancy and Postpartum

Systematic Review Questions

What is the relationship between physical activity, affect, anxiety, and depression during pregnancy and postpartum (up to one year)?

- a. What dose of physical activity is associated with the reported quantitative benefit or risk?
- b. Is there a dose-response relationship? If yes, what is the shape of the relationship?
- c. Does the relationship vary by age, race/ethnicity, socio-economic status, or weight status?

Population

Pregnant adolescents and women and postpartum

Key Definitions

- Postpartum period: Date of birth through one year after birth

Exposure

All types and intensities of physical activity, including lifestyle activities, leisure activities, and sedentary behavior

Comparison

Pregnant adolescents and women and postpartum mothers who participate in varying levels of physical activity, including no reported physical activity

Endpoint Health Outcomes

Affect
Anxiety
Depression

Appendix B: Final Search Strategy

Search Strategy: PubMed (Systematic Reviews, Meta-Analyses, Pooled Analyses, and High-Quality Reports)

Database: PubMed; Date of Search: 8/22/17; 27 results (18 results already in database, 9 unique results)

Set	Search Strategy
Limit: Date	("2006/01/01"[PDAT] : "3000/12/31"[PDAT])
Limit: Language	AND (English[lang])
Limit: Exclude animal only	NOT ("Animals"[Mesh] NOT ("Animals"[Mesh] AND "Humans"[Mesh]))
Limit: Publication Type Include (Systematic Reviews/Meta-Analyses)	AND (systematic[sb] OR meta-analysis[pt] OR "systematic review"[tiab] OR "systematic literature review"[tiab] OR metaanalysis[tiab] OR "meta analysis"[tiab] OR metanalyses[tiab] OR "meta analyses"[tiab] OR "pooled analysis"[tiab] OR "pooled analyses"[tiab] OR "pooled data"[tiab])
Limit: Publication Type Exclude (Systematic Reviews/Meta-Analyses)	NOT ("comment"[Publication Type] OR "editorial"[Publication Type])
Physical Activity	AND (("Aerobic endurance"[tiab] OR "Bicycl*" [tiab] OR "Endurance training"[tiab] OR "Exercise"[mh] OR "Exercise"[tiab] OR "Exercises"[tiab] OR "Free living activities"[tiab] OR "Free living activity"[tiab] OR "Functional training"[tiab] OR "Leisure-time physical activity"[tiab] OR "Lifestyle activities"[tiab] OR "Lifestyle activity"[tiab] OR "Muscle stretching exercises"[mh] OR "Physical activity"[tiab] OR "Qi gong"[tiab] OR "Recreational activities"[tiab] OR "Recreational activity"[tiab] OR "Resistance training"[tiab] OR "Running"[tiab] OR "Sedentary lifestyle"[mh] OR "Speed training"[tiab] OR "Strength training"[tiab] OR "Tai chi"[tiab] OR "Tai ji"[mh] OR "Tai ji"[tiab] OR "Training duration"[tiab] OR "Training frequency"[tiab] OR "Training intensity"[tiab] OR "Treadmill"[tiab] OR "Walking"[tiab] OR "Weight lifting"[tiab] OR "Weight training"[tiab] OR "Yoga"[mh] OR "Yoga"[tiab]) OR ("Aerobic activities"[tiab] OR "Aerobic activity"[tiab] OR "Cardiovascular activities"[tiab] OR "Cardiovascular activity"[tiab] OR "Endurance activities"[tiab] OR "Endurance activity"[tiab] OR "Physical activities"[tiab] OR "Physical conditioning"[tiab] OR "Sedentary"[tiab]) NOT medline[sb]))
Outcome	AND ("eclampsia"[tiab] OR "pre-eclampsia"[tiab] OR "pre-eclampsia"[mh] OR "preeclampsia"[tiab])

Search Strategy: CINAHL (Systematic Reviews, Meta-Analyses, Pooled Analyses, and High-Quality Reports)

Database: CINAHL; Date of Search: 8/20/2017; 10 results (0 unique results)

Terms searched in title or abstract

Set	Search Strategy
Physical Activity	("Aerobic endurance" OR "Bicycl*" OR "Endurance training" OR "Exercise" OR "Exercises" OR "Free living activities" OR "Free living activity" OR "Functional training" OR "Leisure-time physical activity" OR "Lifestyle activities" OR "Lifestyle activity" OR "Muscle stretching exercises" OR "Physical activity" OR "Qi gong" OR "Recreational activities" OR "Recreational activity" OR "Resistance training" OR "Running" OR "Sedentary lifestyle" OR "Speed training" OR "Strength training" OR "Tai chi" OR "Tai ji" OR "Tai ji" OR "Training duration" OR "Training frequency" OR "Training intensity" OR "Treadmill" OR "Walking" OR "Weight lifting" OR "Weight training" OR "Yoga" OR "Aerobic activities" OR "Aerobic activity" OR "Cardiovascular activities" OR "Cardiovascular activity" OR "Endurance activities" OR "Endurance activity" OR "Physical activities" OR "Physical conditioning" OR "Sedentary")
Outcomes	("eclampsia" OR "pre-eclampsia" OR "preeclampsia")
Systematic Reviews and Meta-Analyses	("systematic review" OR "systematic literature review" OR metaanalysis OR "meta analysis" OR metanalyses OR "meta analyses" OR "pooled analysis" OR "pooled analyses" OR "pooled data")
Limits	2006–April 2017 English language Peer reviewed Exclude Medline records Human

Search Strategy: Cochrane (Systematic Reviews, Meta-Analyses, Pooled Analyses, and High-Quality Reports)

Database: Cochrane; Date of Search: 8/20/17; 10 results (0 unique results)

Terms searched in title, abstract, or keywords

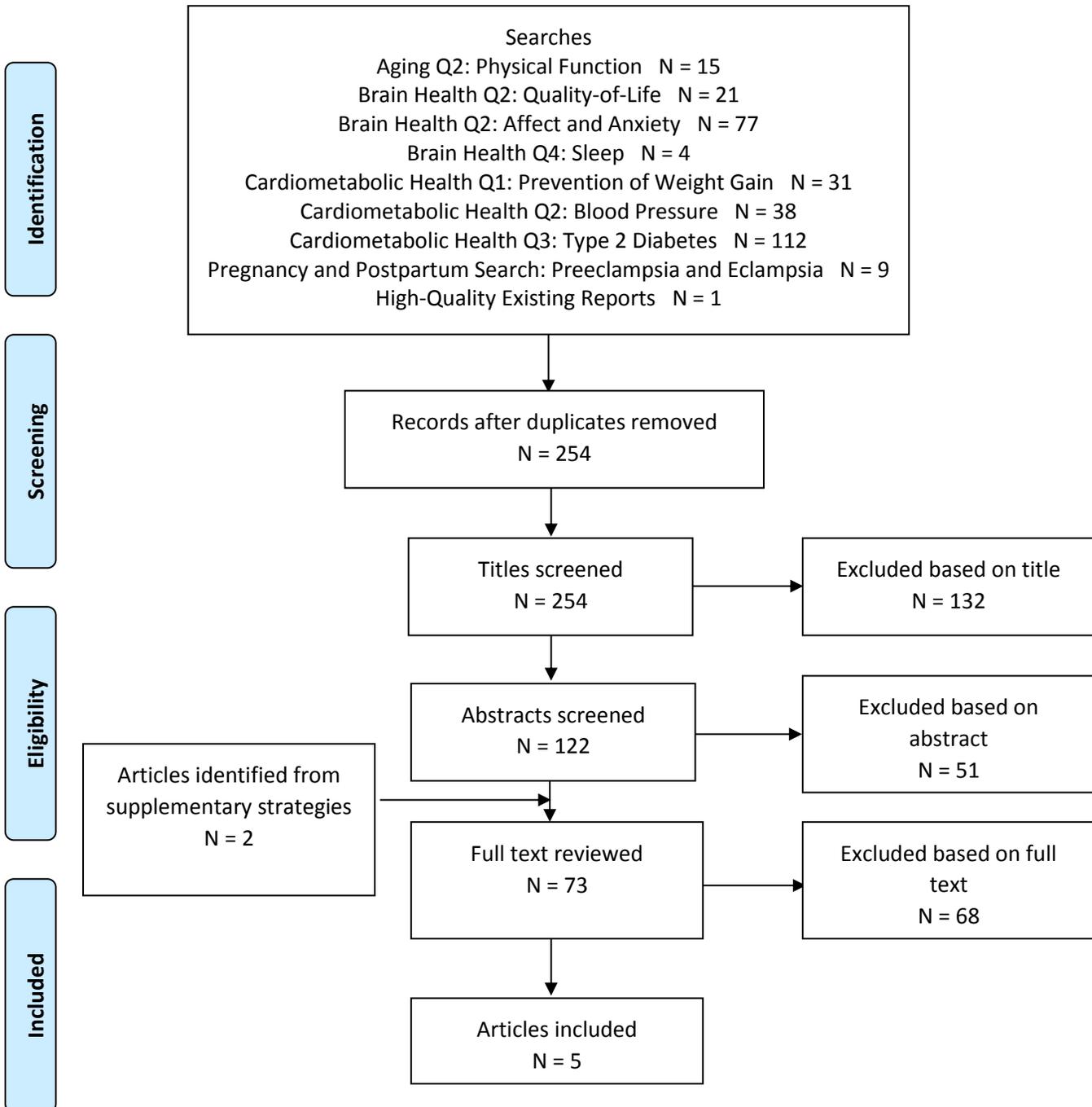
Set	Search Terms
Physical Activity	("Aerobic endurance" OR "Bicycl*" OR "Endurance training" OR "Exercise" OR "Exercises" OR "Free living activities" OR "Free living activity" OR "Functional training" OR "Leisure-time physical activity" OR "Lifestyle activities" OR "Lifestyle activity" OR "Muscle stretching exercises" OR "Physical activity" OR "Qi gong" OR "Recreational activities" OR "Recreational activity" OR "Resistance training" OR "Running" OR "Sedentary lifestyle" OR "Speed training" OR "Strength training" OR "Tai chi" OR "Tai ji" OR "Tai ji" OR "Training duration" OR "Training frequency" OR "Training intensity" OR "Treadmill" OR "Walking" OR "Weight lifting" OR "Weight training" OR "Yoga" OR "Aerobic activities" OR "Aerobic activity" OR "Cardiovascular activities" OR "Cardiovascular activity" OR "Endurance activities" OR "Endurance activity" OR "Physical activities" OR "Physical conditioning" OR "Sedentary")
Outcomes	("eclampsia" OR "pre-eclampsia" OR "preeclampsia")
Limits	2006-present Cochrane Reviews and Other Reviews Word variations will not be searched

Supplementary Strategies

At full text review members of the Physical Activity Guidelines Pregnancy and Postpartum Work Group identified two relevant articles for consideration^{6,7} that were not captured by the search strategies.

Appendix C: Literature Tree

Existing Systematic Reviews, Meta-Analyses, Pooled Analyses, and Reports Literature Tree



Appendix D: Inclusion/Exclusion Criteria

Pregnancy and Postpartum Work Group

What is the relationship between physical activity, affect, anxiety, and depression during pregnancy and postpartum (up to one year)?

- What dose of physical activity is associated with the reported quantitative benefit or risk?
- Is there a dose-response relationship? If yes, what is the shape of the relationship?
- Does the relationship vary by age, race/ethnicity, socio-economic status, or weight status?

Category	Inclusion/Exclusion Criteria	Notes/Rationale
Publication Language	Include: <ul style="list-style-type: none"> Studies published with full text in English 	
Publication Status	Include: <ul style="list-style-type: none"> Studies published in peer-reviewed journals Reports determined to have appropriate suitability and quality by PAGAC Exclude: <ul style="list-style-type: none"> Grey literature, including unpublished data, manuscripts, abstracts, conference proceedings 	
Research Type	Include: <ul style="list-style-type: none"> Original research Meta-analyses Systematic reviews Pooled analyses Reports determined to have appropriate suitability and quality by PAGAC 	
Study Subjects	Include: <ul style="list-style-type: none"> Human subjects 	
	<ul style="list-style-type: none"> Pregnant adolescents and women Postpartum adolescents and women 	
Age of Study Subjects	Include: <ul style="list-style-type: none"> Pregnant or postpartum adolescents and women: All ages 	
Health Status of Study Subjects	Exclude: <ul style="list-style-type: none"> Studies that specifically include people because of their disease state (e.g., cancer, chronic disease, diabetes, cardiovascular disease) Participants hospitalized for reasons other than birth/delivery only (acute care, admitted into the hospital, rehabilitation facilities) Nonambulatory adults only 	
Comparison	Include: <ul style="list-style-type: none"> Pregnant women and postpartum mothers who participate in varying levels of physical activity, including no reported physical activity 	

Date of Publication	<p>Include:</p> <ul style="list-style-type: none"> • Original research published 2006 to present • Systematic reviews and meta-analyses published from 2006 to present 	
Study Design	<p>Include:</p> <ul style="list-style-type: none"> • Randomized controlled trials • Non-randomized controlled trials • Prospective cohort studies • Retrospective cohort studies • Case-control studies • Systematic reviews • Meta-analyses • Pooled reports • PAGAC-approved reports <p>Exclude:</p> <ul style="list-style-type: none"> • Cross-sectional studies • Before-and-after studies • Narrative reviews • Commentaries • Editorials 	
Exposure/ Intervention	<p>Include studies in which the exposure or intervention is:</p> <ul style="list-style-type: none"> • All types and intensities of physical activity, including lifestyle activities, leisure activities, and sedentary behavior <p>Exclude:</p> <ul style="list-style-type: none"> • Studies missing physical activity (mental games such as Sudoku instead of physical activities) • Studies of a single, acute session of exercise • Studies of a disease-specific therapeutic exercise delivered by a medical professional (e.g., physical therapist) • Studies with measures of physical fitness as the exposure • Studies of multimodal interventions that do not present data on physical activity alone • Studies that only use physical activity as a confounding variable 	
Outcome	<p>Include studies in which the outcome is:</p> <ul style="list-style-type: none"> • Affect • Anxiety • Depression 	

Appendix E: Rationale for Exclusion at Abstract or Full-Text Triage for Existing Systematic Reviews, Meta-Analyses, Pooled Analyses, and Reports

The table below lists the excluded articles with at least one reason for exclusion, but may not reflect all possible reasons.

Citation	Outcome	Population	Study Design	Exposure	Not ideal fit for replacement of de novo search	Other
Allen R, Rogozinska E, Sivarajasingam P, Khan KS, Thangaratinam S. Effect of diet- and lifestyle-based metabolic risk-modifying interventions on preeclampsia: a meta-analysis. <i>Acta Obstet Gynecol Scand</i> . 2014;93(10):973-985. doi:10.1111/aogs.12467.				X		
Amorim Adegboye AR, Linne YM. Diet or exercise, or both, for weight reduction in women after childbirth. <i>Cochrane Database Syst Rev</i> . 2013;(7):CD005627. doi:10.1002/14651858.CD005627.pub3.	X					
Amorim AR, Linne YM, Lourenco PM. Diet or exercise, or both, for weight reduction in women after childbirth. <i>Cochrane Database Syst Rev</i> . 2007;(3):Cd005627. doi:10.1002/14651858.CD005627.pub2.						X
Aune D, Saugstad OD, Henriksen T, et al. Physical activity and the risk of preeclampsia: a systematic review and meta-analysis. <i>Epidemiology</i> . 2014. 25(3):331-43.	X					
Aune D, Sen A, Henriksen T, Saugstad OD, Tonstad S. Physical activity and the risk of gestational diabetes mellitus: a systematic review and dose-response meta-analysis of epidemiological studies. <i>Eur J Epidemiol</i> . 2016;31(10):967-997. doi:10.1007/s10654-016-0176-0.	X					
Bain E, Crane M, Tieu J, et al. Diet and exercise interventions for preventing gestational diabetes mellitus. <i>Cochrane Database Syst Rev</i> . 2015;(4):Cd010443. doi:10.1002/14651858.CD010443.pub2.				X		
Beddoe AE, Lee KA. Mind-body interventions during pregnancy. <i>J Obstet Gynecol Neonatal Nurs</i> . 2008;37(2):165-175. doi:10.1111/j.1552-6909.2008.00218.x.				X		

Citation	Outcome	Population	Study Design	Exposure	Not ideal fit for replacement of de novo search	Other
Berger AA, Peragallo-Urrutia R, Nicholson WK. Systematic review of the effect of individual and combined nutrition and exercise interventions on weight, adiposity and metabolic outcomes after delivery: evidence for developing behavioral guidelines for post-partum weight control. <i>BMC Pregnancy Childbirth</i> . 2014;14:319. doi:10.1186/1471-2393-14-319.	X					
Bgeginski R, Ribeiro PA, Mottola MF, Ramos JG. Effects of weekly supervised exercise or physical activity counseling on fasting blood glucose in women diagnosed with gestational diabetes mellitus: a systematic review and meta-analysis of randomized trials. <i>J Diabetes</i> . Dec 2016. doi:10.1111/1753-0407.12519.		X				
Bo K, Artal R, Barakat R, et al. Exercise and pregnancy in recreational and elite athletes: 2016 evidence summary from the IOC expert group meeting, Lausanne. Part 1-exercise in women planning pregnancy and those who are pregnant. <i>Br J Sports Med</i> . 2016;50(10):571-589. doi:10.1136/bjsports-2016-096218.			X			
Bonzini M, Coggon D, Palmer KT. Risk of prematurity, low birthweight and pre-eclampsia in relation to working hours and physical activities: a systematic review. <i>Occup Environ Med</i> . 2007;64(4):228-243. doi:10.1136/oem.2006.026872.	X					
Brown J, Alwan NA, West J, et al. Lifestyle interventions for the treatment of women with gestational diabetes. <i>Cochrane Database Syst Rev</i> . 2017;5:CD011970. doi:10.1002/14651858.CD011970.pub2.				X		
Busanich BM, Verscheure SD. Does McKenzie therapy improve outcomes for back pain? <i>J Athl Train</i> . 2006;41(1):117-119.		X				
Cameron AJ, Spence AC, Laws R, Hesketh KD, Lioret S, Campbell KJ. A review of the relationship between socioeconomic position and the early-life predictors of obesity. <i>Curr Obes Rep</i> . 2015;4(3):350-362. doi:10.1007/s13679-015-0168-5.	X					

Citation	Outcome	Population	Study Design	Exposure	Not ideal fit for replacement of de novo search	Other
Carolan-Olah MC. Educational and intervention programmes for gestational diabetes mellitus (GDM) management: an integrative review. <i>Collegian</i> . 2016;23(1):103-114.				X		
Choi J, Fukuoka Y, Lee JH. The effects of physical activity and physical activity plus diet interventions on body weight in overweight or obese women who are pregnant or in postpartum: a systematic review and meta-analysis of randomized controlled trials. <i>Prev Med</i> . 2013;56(6):351-364. doi:10.1016/j.ypmed.2013.02.021.				X		
Cooney GM, Dwan K, Greig CA, et al. Exercise for depression. <i>Cochrane Database Syst Rev</i> . 2013;(9):Cd004366. doi:10.1002/14651858.CD004366.pub6.		X				
Cooper D, Yang L. <i>Pregnancy, Exercise</i> . Treasure Island, FL: StatPearls Publishing; 2017.			X			
Craig M, Howard L. Postnatal depression. <i>BMJ Clin Evid</i> . Jan 2009;pii:1407.		X				
Curtis K, Weinrib A, Katz J. Systematic review of yoga for pregnant women: current status and future directions. <i>Evid Based Complement Alternat Med</i> . 2012;2012:715942. doi:10.1155/2012/715942.	X					
Daley A. Exercise and depression: a review of reviews. <i>J Clin Psychol Med Settings</i> . 2008;15(2):140-147. doi:10.1007/s10880-008-9105-z.			X			
Daley AJ, Foster L, Long G, et al. The effectiveness of exercise for the prevention and treatment of antenatal depression: systematic review with meta-analysis. <i>BJOG</i> . 2015;122(1):57-62. doi:10.1111/1471-0528.12909.					X	
Daley A, Jolly K, MacArthur C. The effectiveness of exercise in the management of post-natal depression: systematic review and meta-analysis. <i>Fam Pract</i> . 2009;26(2):154-162. doi:10.1093/fampra/cmn101.		X				
Daley AJ, Jolly K, Sharp DJ, et al. The effectiveness of exercise as a treatment for postnatal depression:			X			

Citation	Outcome	Population	Study Design	Exposure	Not ideal fit for replacement of de novo search	Other
study protocol. <i>BMC Pregnancy Childbirth</i> . 2012;12:45. doi:10.1186/1471-2393-12-45.						
da Silva SG, Ricardo LI, Evenson KR, Hallal PC. Leisure-time physical activity in pregnancy and maternal-child health: a systematic review and meta-analysis of randomized controlled trials and cohort studies. <i>Sports Med</i> . 2017;47(2):295–317. doi:10.1007/s40279-016-0565-2.	X					
Davies GA, Maxwell C, McLeod L, et al. Obesity in pregnancy. <i>J Obstet Gynaecol Can</i> . 2010;32(2):165-173. doi:10.1016/S1701-2163(16)34432-2.				X		
Delissaint D, McKyer EL. A systematic review of factors utilized in preconception health behavior research. <i>Health Educ Behav</i> . 2011;38(6):603-616. doi:10.1177/1090198110389709.				X		
Dietz P, Watson ED, Sattler MC, Ruf W, Titze S, van Poppel M. The influence of physical activity during pregnancy on maternal, fetal or infant heart rate variability: a systematic review. <i>BMC Pregnancy Childbirth</i> . 2016;16(1):326. doi:10.1186/s12884-016-1121-7.	X					
Di Mascio D, Magro-Malosso ER, Saccone G, Marhefka GD, Berghella V. Exercise during pregnancy in normal-weight women and risk of preterm birth: a systematic review and meta-analysis of randomized controlled trials. <i>Am J Obstet Gynecol</i> . 2016;215(5):561–571. doi:10.1016/j.ajog.2016.06.014.	X					
DiNallo JM, Downs DS. The role of exercise in preventing and treating gestational diabetes: a comprehensive review and recommendations for future research. <i>J Appl Biobehav Res</i> . 2008;12(3-4):141–177. doi:10.1111/j.1751-9861.2008.00019.x.	X					
Dodd JM, Grivell RM, Crowther CA, Robinson JS. Antenatal interventions for overweight or obese pregnant women: a systematic review of randomised trials. <i>BJOG</i> . 2010;117(11):1316-1326.				X		

Citation	Outcome	Population	Study Design	Exposure	Not ideal fit for replacement of de novo search	Other
doi:10.1111/j.1471-0528.2010.02540.x.						
Dode MA, dos Santos IS. Non classical risk factors for gestational diabetes mellitus: a systematic review of the literature. <i>Cad Saude Publica</i> . 2009;25(suppl 3):S341–S359.	X					
Elliott-Sale KJ, Barnett CT, Sale C. Systematic review of randomised controlled trials on exercise interventions for weight management during pregnancy and up to one year postpartum among normal weight, overweight and obese women. <i>Pregnancy Hypertens</i> . 2014;4(3):234. doi:10.1016/j.preghy.2014.03.015.	X					
Facchinetti F, Dante G, Petrella E, Neri I. Dietary interventions, lifestyle changes, and dietary supplements in preventing gestational diabetes mellitus: a literature review. <i>Obstet Gynecol Surv</i> . 2014;69(11):669–680. doi:10.1097/OGX.0000000000000121.	X					
Fasanmade OA, Dagogo-Jack S. Diabetes care in Nigeria. <i>Ann Glob Health</i> . 2015;81(6):821–829. doi:10.1016/j.aogh.2015.12.012.	X					
Fazzi C, Saunders DH, Linton K, Norman JE, Reynolds RM. Sedentary behaviours during pregnancy: a systematic review. <i>Int J Behav Nutr Phys Act</i> . 2017;14(1):32. doi:10.1186/s12966-017-0485-z.	X					
Ferraro ZM, Gaudet L, Adamo KB. The potential impact of physical activity during pregnancy on maternal and neonatal outcomes. <i>Obstet Gynecol Surv</i> . 2012;67(2):99-110. doi:10.1097/OGX.0b013e318242030e.			X			
Field T. Prenatal depression risk factors, developmental effects and interventions: a review. <i>J Pregnancy Child Health</i> . 2017;4(1). doi:10.4172/2376-127X.1000301.			X			
Firth A, Haith-Cooper M, Egan D. Do psychosocial interventions have an impact on maternal perception of perinatal depression? <i>Br J Midwifery</i> . 2016;24(12):855–866. doi:10.12968/bjom.2016.24.12.855.	X					

Citation	Outcome	Population	Study Design	Exposure	Not ideal fit for replacement of de novo search	Other
Foster NE, Bishop A, Bartlam B, et al. Evaluating Acupuncture and Standard care for pregnant women with back pain (EASE Back): a feasibility study and pilot randomised trial. <i>Health Technol Assess</i> . 2016;20(33):1-236. doi:10.3310/hta20330.			X			
Gardner B, Wardle J, Poston L, Croker H. Changing diet and physical activity to reduce gestational weight gain: a meta-analysis. <i>Obes Rev</i> . 2011;12(7):e602-e620. doi:10.1111/j.1467-789X.2011.00884.x.				X		
Gavard JA, Artal R. Effect of exercise on pregnancy outcome. <i>Clin Obstet Gynecol</i> . 2008;51(2):467-480. doi:10.1097/GRF.0b013e31816feb1d						X
Gilinsky AS, Kirk AF, Hughes AR, Lindsay RS. Lifestyle interventions for type 2 diabetes prevention in women with prior gestational diabetes: A systematic review and meta-analysis of behavioural, anthropometric and metabolic outcomes. <i>Prev Med Rep</i> . 2015;2:448-461. doi:10.1016/j.pmedr.2015.05.009.		X				
Gindlesberger D, Schrage S, Johnson S, Neher JO. Clinical inquiries. What's the best treatment for gestational diabetes? <i>J Fam Pract</i> . 2007;56(9):757-758.		X				
Gong H, Ni C, Shen X, Wu T, Jiang C. Yoga for prenatal depression: a systematic review and meta-analysis. <i>BMC Psychiatry</i> . 2015;15:14. doi:10.1186/s12888-015-0393-1.		X				
Han S, Middleton P, Crowther CA. Exercise for pregnant women for preventing gestational diabetes mellitus. <i>Cochrane Database Syst Rev</i> . 2012;(7):Cd009021. doi:10.1002/14651858.CD009021.pub2.	X					
Harrison AL, Shields N, Taylor NF, Frawley HC. Exercise improves glycaemic control in women diagnosed with gestational diabetes mellitus: a systematic review. <i>J Physiother</i> . 2016;62(4):188-196. doi:10.1016/j.jphys.2016.08.003.		X				
Hollenbach D, Broker R, Herlehy S, Stuber K. Non-pharmacological					X	

Citation	Outcome	Population	Study Design	Exposure	Not ideal fit for replacement of de novo search	Other
interventions for sleep quality and insomnia during pregnancy: a systematic review. <i>J Can Chiropr Assoc.</i> 2013;57(3):260-270.						
Jacqueminet S, Jannot-Lamotte MF. Therapeutic management of gestational diabetes. <i>Diabetes Metab.</i> 2010;36(6 Pt 2):658-671. doi:10.1016/j.diabet.2010.11.016.		X				
Johnson M, Campbell F, Messina J, Preston L, Buckley Woods H, Goyder E. Weight management during pregnancy: a systematic review of qualitative evidence. <i>Midwifery.</i> 2013;29(12):1287-1296. doi:10.1016/j.midw.2012.11.016.			X			
Jones L, Othman M, Dowswell T, et al. Pain management for women in labour: an overview of systematic reviews. <i>Cochrane Database Syst Rev.</i> 2012;(3):CD009234. doi:10.1002/14651858.CD009234.pub2.	X					
Kasawara KT, do Nascimento SL, Costa ML, Surita FG, e Silva JL. Exercise and physical activity in the prevention of pre-eclampsia: systematic review. <i>Acta Obstet Gynecol Scand.</i> 2012;91(10):1147-1157. doi:10.1111/j.1600-0412.2012.01483.x.	X					
Kinser PA, Pauli J, Jallo N, et al. Physical activity and yoga-based approaches for pregnancy-related low back and pelvic pain. <i>J Obstet Gynecol Neonatal Nurs.</i> 2017;46(3):334-346. doi:10.1016/j.jogn.2016.12.006.			X			
Kuhlmann AK, Dietz PM, Galavotti C, England LJ. Weight-management interventions for pregnant or postpartum women. <i>Am J Prev Med.</i> 2008;34(6):523-528. doi:10.1016/j.amepre.2008.02.010.				X		
Lamina S, Agbanusi E. Effect of aerobic exercise training on maternal weight gain in pregnancy: a meta-analysis of randomized controlled trials. <i>Ethiop J Health Sci.</i> 2013;23(1):59-64.						X
Lawrence A, Lewis L, Hofmeyr GJ, Styles C. Maternal positions and mobility during first stage labour. <i>Cochrane Database Syst Rev.</i>				X		

Citation	Outcome	Population	Study Design	Exposure	Not ideal fit for replacement of de novo search	Other
2013;(10):CD003934. doi:10.1002/14651858.CD003934.pu b4.						
Lawrence A, Lewis L, Hofmeyr GJ, Dowswell T, Styles C. Maternal positions and mobility during first stage labour. <i>Cochrane Database Syst Rev.</i> 2009;(2):Cd003934. doi:10.1002/14651858.CD003934.pu b2.				X		
Liddle SD, Pennick V. Interventions for preventing and treating low-back and pelvic pain during pregnancy. <i>Cochrane Database Syst Rev.</i> 2015;(9):Cd001139. doi:10.1002/14651858.CD001139.pu b4.	X					
Madhuvrata P, Govinden G, Bustani R, Song S, Farrell TA. Prevention of gestational diabetes in pregnant women with risk factors for gestational diabetes: a systematic review and meta-analysis of randomised trials. <i>Obstet Med.</i> 2015;8(2):68–85. doi:10.1177/1753495X15576673.	X					
Magro-Malosso ER, Saccone G, Di Mascio D, Di Tommaso M, Berghella V. Exercise during pregnancy and risk of preterm birth in overweight and obese women: a systematic review and meta-analysis of randomized controlled trials. <i>Acta Obstet Gynecol Scand.</i> 2017;96(3):263–273. doi:10.1111/aogs.13087.	X					
Manna P, Jain SK. Obesity, oxidative stress, adipose tissue dysfunction, and the associated health risks: causes and therapeutic strategies. <i>Metab Syndr Relat Disord.</i> 2015;13(10):423-444. doi:10.1089/met.2015.0095.	X					
Marc I, Toureche N, Ernst E, et al. Mind-body interventions during pregnancy for preventing or treating women's anxiety. <i>Cochrane Database Syst Rev.</i> 2011;(7):Cd007559. doi:10.1002/14651858.CD007559.pu b2.						X
Mathias PC, Elmhiri G, de Oliveira JC, et al. Maternal diet, bioactive molecules, and exercising as reprogramming tools of metabolic programming. <i>Eur J Nutr.</i>			X			

Citation	Outcome	Population	Study Design	Exposure	Not ideal fit for replacement of de novo search	Other
2014;53(3):711-722. doi:10.1007/s00394-014-0654-7.						
McDonald SM, Liu J, Wilcox S, Lau EY, Archer E. Does dose matter in reducing gestational weight gain in exercise interventions? A systematic review of literature. <i>J Sci Med Sport</i> . 2016;19(4):323–335. doi:10.1016/j.jsams.2015.03.004.	X					
Mead GE, Morley W, Campbell P, Greig CA, McMurdo M, Lawlor DA. Exercise for depression. <i>Cochrane Database Syst Rev</i> . 2008;(4):CD004366. doi:10.1002/14651858.CD004366.pub3.		X				
Meher S, Duley L. Exercise or other physical activity for preventing pre-eclampsia and its complications. <i>Cochrane Database Syst Rev</i> . April 2006;(2):Cd005942. doi:10.1002/14651858.CD005942.					X	
Meher S, Duley L. Rest during pregnancy for preventing pre-eclampsia and its complications in women with normal blood pressure. <i>Cochrane Database Syst Rev</i> . 2006;(2):Cd005939. doi:10.1002/14651858.CD005939.					X	
Misra A, Khurana L. Obesity and the metabolic syndrome in developing countries. <i>J Clin Endocrinol Metab</i> . 2008;93(11)(suppl 1):S9–S30. doi:10.1210/jc.2008-1595.		X				
Moran LJ, Hutchison SK, Norman RJ, Teede HJ. Lifestyle changes in women with polycystic ovary syndrome. <i>Cochrane Database of Systematic Reviews</i> . 2011;(2):CD007506. doi:10.1002/14651858.CD007506.pub2.		X				
Morkved S, Bo K. Effect of pelvic floor muscle training during pregnancy and after childbirth on prevention and treatment of urinary incontinence: a systematic review. <i>Br J Sports Med</i> . 2014;48(4):299-310. doi:10.1136/bjsports-2012-091758.	X					
Muktabhant B, Lawrie TA, Lumbiganon P, Laopaiboon M. Diet or exercise, or both, for preventing excessive weight gain in pregnancy. <i>Cochrane Database Syst Rev</i> .	X					

Citation	Outcome	Population	Study Design	Exposure	Not ideal fit for replacement of de novo search	Other
2015;(6):Cd007145. doi:10.1002/14651858.CD007145.pu b3.						
Nascimento SL, Pudwell J, Surita FG, Adamo KB, Smith GN. The effect of physical exercise strategies on weight loss in postpartum women: a systematic review and meta-analysis. <i>Int J Obes (Lond)</i> . 2014;38(5):626–635. doi:10.1038/ijo.2013.183.	X					
Nascimento SL, Surita FG, Parpinelli MA, Cecatti JG. Physical exercise, weight gain, and perinatal outcomes in overweight and obese pregnant women: a systematic review of clinical trials. <i>Cad Saude Publica</i> . 2011;27(3):407-416.						X
Nascimento SL, Surita FG, Cecatti JG. Physical exercise during pregnancy: a systematic review. <i>Curr Opin Obstet Gynecol</i> . 2012;24(6):387-394. doi:10.1097/GCO.0b013e328359f131.						X
Nasiri-Amiri F, Bakhtiari A, Faramarzi M, Adib Rad H, Pasha H. The association between physical activity during pregnancy and gestational diabetes mellitus: a case-control study. <i>Int J Endocrinol Metab</i> . 2016;14(3):e37123. doi:10.5812/ijem.37123.			X			
O'Brien OA, McCarthy M, Gibney ER, McAuliffe FM. Technology-supported dietary and lifestyle interventions in healthy pregnant women: a systematic review. <i>Eur J Clin Nutr</i> . 2014;68(7):760-766. doi:10.1038/ejcn.2014.59.				X		
Oostdam N, van Poppel MN, Wouters MG, van Mechelen W. Interventions for preventing gestational diabetes mellitus: a systematic review and meta-analysis. <i>J Womens Health (Larchmt)</i> . 2011;20(10):1551–1563. doi:10.1089/jwh.2010.2703.	X					
Osman SM, Saaka M, Siassi F, et al. A comparison of pregnancy outcomes in Ghanaian women with varying dietary diversity: a prospective cohort study protocol. <i>BMJ Open</i> . 2016;6(9):e011498. doi:10.1136/bmjopen-2016-011498.			X			

Citation	Outcome	Population	Study Design	Exposure	Not ideal fit for replacement of de novo search	Other
Oteng-Ntim E, Varma R, Croker H, Poston L, Doyle P. Lifestyle interventions for overweight and obese pregnant women to improve pregnancy outcome: systematic review and meta-analysis. <i>BMC Med.</i> 2012;10:47. doi:10.1186/1741-7015-10-47.				X		
Pennick V, Liddle SD. Interventions for preventing and treating pelvic and back pain in pregnancy. <i>Cochrane Database Syst Rev.</i> 2013;(8):Cd001139. doi:10.1002/14651858.CD001139.pub3.						X
Pennick VE, Young G. Interventions for preventing and treating pelvic and back pain in pregnancy. <i>Cochrane Database Syst Rev.</i> 2007;(2):Cd001139. doi:10.1002/14651858.CD001139.pub2.	X					
Peppers D, Figoni SF, Carroll BW, Chen MM, Song S, Mathiyakom W. Influence of functional capacity evaluation on physician's assessment of physical capacity of veterans with chronic pain: a retrospective analysis. <i>PM R.</i> 2016;9(7):652-659. doi:10.1016/j.pmrj.2016.10.011.			X			
Pivarnik JM, Chambliss HO, Clapp JF, et al. Impact of physical activity during pregnancy and postpartum on chronic disease risk. <i>Med Sci Sports Exerc.</i> 2006;38(5):989-1006. doi:10.1249/01.mss.0000218147.51025.8a.			X			
Regan M. 'Yoga for prenatal depression: a systematic review and meta-analysis.' Gong H et al (2015). <i>BMC Psychiatry</i> 15(1):14. <i>The Practising Midwife.</i> 2015;18(5):38-41.			X			
Richards E, van Kessel G, Virgara R, Harris P. Does antenatal physical therapy for pregnant women with low back pain or pelvic pain improve functional outcomes? A systematic review. <i>Acta Obstet Gynecol Scand.</i> 2012;91(9):1038-1045. doi:10.1111/j.1600-0412.2012.01462.x.	X					
Rimer J, Dwan K, Lawlor DA, et al. Exercise for depression. <i>Cochrane</i>		X				

Citation	Outcome	Population	Study Design	Exposure	Not ideal fit for replacement of de novo search	Other
<i>Database Syst Rev.</i> 2012;(7):Cd004366. doi:10.1002/14651858.CD004366.pub5.						
Rogozinska E, Fen Y, Molyneaux E, Khan KS, Thangaratnam S. Variation in outcomes in trials reporting effects of diet and lifestyle based intervention on pregnancy outcomes: a systematic review. <i>Pregnancy Hypertens.</i> 2014;4(3):237. doi:10.1016/j.preghy.2014.03.024.			X			
Rogozińska E, Marlin N, Yang F, et al; i-WIP (International Weight Management in Pregnancy) Collaborative Group. Variations in reporting of outcomes in randomized trials on diet and physical activity in pregnancy: a systematic review. <i>J Obstet Gynaecol Res.</i> 2017;43(7):1101–1110. doi:10.1111/jog.13338.	X					
Ronnberg AK, Nilsson K. Interventions during pregnancy to reduce excessive gestational weight gain: a systematic review assessing current clinical evidence using the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) system. <i>BJOG.</i> 2010;117(11):1327-1334. doi:10.1111/j.1471-0528.2010.02619.x.				X		
Ruifrok AE, Rogozinska E, van Poppel MN, et al. Study protocol: differential effects of diet and physical activity based interventions in pregnancy on maternal and fetal outcomes—individual patient data (IPD) meta-analysis and health economic evaluation. <i>Syst Rev.</i> 2014;3:131. doi:10.1186/2046-4053-3-131.			X			
Rungsiprakarn P, Laopaiboon M, Sangkomkamhang US, Lumbiganon P, Pratt JJ. Interventions for treating constipation in pregnancy. <i>Cochrane Database Syst Rev.</i> 2015;(9):Cd011448. doi:10.1002/14651858.CD011448.pub2.				X		
Russo LM, Nobles C, Ertel KA, Chasan-Taber L, Whitcomb BW. Physical activity interventions in pregnancy and risk of gestational	X					

Citation	Outcome	Population	Study Design	Exposure	Not ideal fit for replacement of de novo search	Other
diabetes mellitus: a systematic review and meta-analysis. <i>Obstet Gynecol.</i> 2015;125(3):576–582. doi:10.1097/AOG.0000000000000691.						
Saligheh M, Hackett D, Boyce P, Cobley S. Can exercise or physical activity help improve postnatal depression and weight loss? A systematic review. <i>Arch Womens Ment Health.</i> July 2017. doi:10.1007/s00737-017-0750-9.				X		
Sanabria-Martinez G, Garcia-Hermoso A, Poyatos-Leon R, Alvarez-Bueno C, Sanchez-Lopez M, Martinez-Vizcaino V. Effectiveness of physical activity interventions on preventing gestational diabetes mellitus and excessive maternal weight gain: a meta-analysis. <i>BIOG.</i> 2015;122(9):1167–1174. doi:10.1111/1471-0528.13429.	X					
Shi Z, MacBeth A. The effectiveness of mindfulness-based interventions on maternal perinatal mental health outcomes: a systematic review. <i>Mindfulness (NY).</i> 2017;8(4):823–847. doi:10.1007/s12671-016-0673-y.				X		
Skouteris H, Morris H, Nagle C, Nankervis A. Behavior modification techniques used to prevent gestational diabetes: a systematic review of the literature. <i>Curr Diab Rep.</i> 2014;14(4):480. doi:10.1007/s11892-014-0480-6.				X		
Snapp CA, Donaldson SK. Gestational diabetes mellitus: physical exercise and health outcomes. <i>Biol Res Nurs.</i> 2008;10(2):145-155. doi:10.1177/1099800408323728.			X			
Song C, Li J, Leng J, Ma RC, Yang X. Lifestyle intervention can reduce the risk of gestational diabetes: a meta-analysis of randomized controlled trials. <i>Obes Rev.</i> 2016;17(10):960–969. doi:10.1111/obr.12442.	X					
Spencer L, Rollo M, Hauck Y, et al. The effect of weight management interventions that include a diet component on weight-related outcomes in pregnant and postpartum women: a systematic review protocol. <i>JBI Database System</i>			X			

Citation	Outcome	Population	Study Design	Exposure	Not ideal fit for replacement of de novo search	Other
Rev Implement Rep. 2015;13(1):88-98. doi:10.11124/jbisrir-2015-1812.						
Steiner RD, Adsit J, Basel D. COL1A1/2-Related Osteogenesis Imperfecta. In: <i>GeneReviews</i> . Seattle (WA): University of Washington, Seattle; 1993-2017.		X				
Streuling I, Beyerlein A, Rosenfeld E, Hofmann H, Schulz T, von Kries R. Physical activity and gestational weight gain: a meta-analysis of intervention trials. <i>BJOG</i> . 2011;118(3):278-284. doi:10.1111/j.1471-0528.2010.02801.x.	X					
Streuling I, Beyerlein A, von Kries R. Can gestational weight gain be modified by increasing physical activity and diet counseling? A meta-analysis of interventional trials. <i>Am J Clin Nutr</i> . 2010;92(4):678-687. doi:10.3945/ajcn.2010.29363.				X		
Sui Z, Grivell RM, Dodd JM. Antenatal exercise to improve outcomes in overweight or obese women: a systematic review. <i>Acta Obstet Gynecol Scand</i> . 2012;91(5):538-545. doi:10.1111/j.1600-0412.2012.01357.x.	X					
Taylor BJ, Heath AL, Galland BC, et al. Prevention of Overweight in Infancy (POI.nz) study: a randomised controlled trial of sleep, food and activity interventions for preventing overweight from birth. <i>BMC Public Health</i> . 2011;11:942. doi:10.1186/1471-2458-11-942.			X			
Thangaratinam S, Rogozinska E, Jolly K, et al. Effects of interventions in pregnancy on maternal weight and obstetric outcomes: meta-analysis of randomised evidence. <i>BMJ</i> . 2012;(344):e2088. doi:10.1136/bmj.e2088.	X					
Thangaratinam S, Rogozinska E, Jolly K, et al. Interventions to reduce or prevent obesity in pregnant women: a systematic review. <i>Health Technol Assess</i> . 2012;16(31):iii-iv, 1-191. doi:10.3310/hta16310.	X					
Tobias DK, Zhang C, van Dam RM, Bowers K, Hu FB. Physical activity before and during pregnancy and risk of gestational diabetes mellitus: a	X					

Citation	Outcome	Population	Study Design	Exposure	Not ideal fit for replacement of de novo search	Other
meta-analysis. <i>Diabetes Care</i> . 2011;34(1):223–229. doi:10.2337/dc10-1368.						
Turawa EB, Musekiwa A, Rohwer AC. Interventions for preventing postpartum constipation. <i>Cochrane Database Syst Rev</i> . 2015;(9):CD011625. doi:10.1002/14651858.CD011625.pub2.				X		
van der Pligt P, Willcox J, Hesketh KD, et al. Systematic review of lifestyle interventions to limit postpartum weight retention: implications for future opportunities to prevent maternal overweight and obesity following childbirth. <i>Obes Rev</i> . 2013;14(10):792–805. doi:10.1111/obr.12053.	X					
Van Kampen M, Devoogdt N, De Groef A, Gielen A, Geraerts I. The efficacy of physiotherapy for the prevention and treatment of prenatal symptoms: a systematic review. <i>Int Urogynecol J</i> . 2015;26(11):1575-1586. doi:10.1007/s00192-015-2684-y.				X		
Vanstone M, Kandasamy S, Giacomini M, DeJean D, McDonald SD. Pregnant women's perceptions of gestational weight gain: a systematic review and meta-synthesis of qualitative research. <i>Matern Child Nutr</i> . Oct 2017;13(4). doi:10.1111/mcn.12374.				X		
Wagg A, Bunn F. Unassisted pelvic floor exercises for postnatal women: a systematic review. <i>J Adv Nurs</i> . 2007;58(5):407–417. doi:10.1111/j.1365-2648.2007.04318.x.	X					
Wiebe HW, Boule NG, Chari R, Davenport MH. The effect of supervised prenatal exercise on fetal growth: a meta-analysis. <i>Obstet Gynecol</i> . 2015;125(5):1185–1194. doi:10.1097/AOG.0000000000000801.	X					
Williams MA, Williamson EM, Heine PJ, et al. Strengthening and stretching for Rheumatoid Arthritis of the Hand (SARAH). A randomised controlled trial and economic evaluation. <i>Health Technol Assess</i> .		X				

Citation	Outcome	Population	Study Design	Exposure	Not ideal fit for replacement of de novo search	Other
2015;19(19):1-222. doi:10.3310/hta19190.						
Wolf, HT, Owe, KM, Juhl, M, et al. Leisure time physical activity and the risk of pre-eclampsia: a systematic review. <i>Matern Child Health J.</i> 2014. 18(4):899-910.	X					
Yin YN, Li XL, Tao TJ, Luo BR, Liao SJ. Physical activity during pregnancy and the risk of gestational diabetes mellitus: a systematic review and meta-analysis of randomised controlled trials. <i>Br J Sports Med.</i> 2014;48(4):290–295. doi:10.1136/bjsports-2013-092596.	X					
Yu Y, Xie R, Shen C, Shu L. Effect of exercise during pregnancy to prevent gestational diabetes mellitus: a systematic review and meta-analysis. <i>J Matern Fetal Neonatal Med.</i> May 2017:1–6. doi:10.1080/14767058.2017.1319929.	X					
Zheng J, Wang H, Ren M. Influence of exercise intervention on gestational diabetes mellitus: a systematic review and meta-analysis. <i>J Endocrinol Invest.</i> April 2017. doi:10.1007/s40618-017-0673-3.	X					
Zhou K, West HM, Zhang J, Xu L, Li W. Interventions for leg cramps in pregnancy. <i>Cochrane Database Syst Rev.</i> 2015;(8):Cd010655. doi:10.1002/14651858.CD010655.pub2.				X		

References

1. Sheffield KM, Woods-Giscombe CL. Efficacy, feasibility, and acceptability of perinatal yoga on women's mental health and well-being: a systematic literature review. *J Holist Nurs*. 2016;34(1):64–79. doi:10.1177/0898010115577976.
2. Shivakumar G, Brandon AR, Snell PG, et al. Antenatal depression: a rationale for studying exercise. *Depress Anxiety*. 2011;28(3):234–242. doi:10.1002/da.20777.
3. McCurdy AP, Boule NG, Sivak A, Davenport MH. Effects of exercise on mild-to-moderate depressive symptoms in the postpartum period: a meta-analysis. *Obstet Gynecol*. 2017;129(6):1087–1097. doi:10.1097/AOG.0000000000002053.
4. 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;44(3):200–208. doi:10.1111/birt.12294.
5. Teychenne M, York R. Physical activity, sedentary behavior, and postnatal depressive symptoms: a review. *Am J Prev Med*. 2013;45(2):217–227. doi:10.1016/j.amepre.2013.04.004.
6. van der Pligt P, Willcox J, Hesketh KD, et al. Systematic review of lifestyle interventions to limit postpartum weight retention: implications for future opportunities to prevent maternal overweight and obesity following childbirth. *Obes Rev*. 2013;14(10):792–805. doi:10.1111/obr.12053.
7. Nascimento SL, Pudwell J, Surita FG, Adamo KB, Smith GN. The effect of physical exercise strategies on weight loss in postpartum women: a systematic review and meta-analysis. *Int J Obes (Lond)*. 2014;38(5):626–635. doi:10.1038/ijo.2013.183.