GUÍA ESPAÑOLA DE PRÁCTICA CLÍNICA SOBRE ACTIVIDAD FÍSICA DURANTE EL EMBARAZO

Spanish Clinical Practice Guideline for physical activity throughout pregnancy

JORNADAS DE TRABAJO DEL 14 y 15 DE NOVIEMBRE DE 2022

ÍNDICE/INDEX

PROGRAMA DE ACTIVIDADES/PROGRAM OF ACTIVITIES

LUNES

10:00 hs. Bienvenida y Presentación de las Jornada de Trabajo

10:30 hs. Introducción, alcance, objetivos, estructura y características de una Guía de Práctica Clínica. El Sistema Nacional de Salud. Herramientas utilizadas en cada fase. Propuesta de Estructura de la GPC. Preguntas PICO, desenlaces y recomendaciones

10:45 hs. Metodología desarrollada para la búsqueda, selección y valoración de la evidencia científica. Primera propuesta de relación de Desenlaces/Recomendaciones.

11:30 hs. Resultados de la calidad de la evidencia científica. Tablas informativas de las RS+MA. Relación entre Desenlaces y Recomendaciones. Primera Valoración por parte de los subgrupos del Grupo de Elaboración de la Guía (GEG).

12:15. Café descanso

12:45. Determinación Desenlaces/Recomendaciones y Grupos. Valoración de la Fuerza/Grado de cada Recomendación. Primer borrador de las Recomendaciones con su grado/fuerza y el nivel de la calidad de la evidencia

14:00 hs. Comida.

MONDAY

10:00 a.m. Welcome and Presentation of the Working Sessions

10:30 am. Introduction, scope, objectives, structure and characteristics of a Clinical Practice Guideline. The Spanish National Health System. Tools used in each phase. Proposed structure of the CPG. PICO questions, outcomes and recommendatios.

10:45 am. Methodology developed for the search, selection and evaluation of scientific evidence. First proposal of relation of Outcomes/Recommendations.

11:30 am. Results of the quality of the scientific evidence. Informative tables of the SR+MA. Relationship between Outcomes and Recommendations. First Assessment by the subgroups of the Guidelines Elaboration Group (GEG).

12:15 am. Coffee break

12:45 am. Determination of Outcomes/Recommendations and Groups. Assessment of the Strength of Recommendations. First draft of the Recommendations with strength and level of evidence quality.

02:00 pm. Lunch.

MARTES

08:45 Recogida y traslado al Palacio.

09:15 hs. Bienvenida y visita al Palacio.

10:15. Inicio de la Jornada de trabajo. Presentación del Primer borrador de la estructura general de la Guía de Práctica Clínica (GPC).

11:00. Café descanso.

11:45. Exposiciones. Presentación de propuestas de investigación.

14:00 Comida.

16:15 Retorno a la Facultad.

TUESDAY

08:45 am. Pick up and transfer to the Palace.

09:15 a.m. Welcome and visit to the Palace.

10:15 am. Start of the working day. Presentation of the first draft of the general structure of the Clinical Practice Guideline (CPG).

11:00 am. Coffee break.

11:45 am. Presentation of research proposals.

02:00 pm Lunch.

04:15 pm Return to the Faculty.

DIAGRAMA GENERAL

Figura 1: Diagrama de Flujo del proceso de elaboración de la Guía de Práctica Clínica.

FLOW CHART

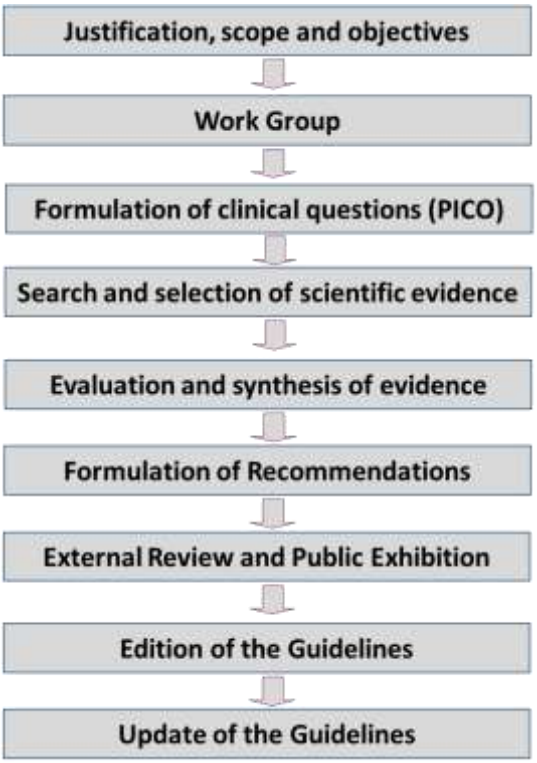

Figure 1: Flowchart of the Clinical Practice Guideline development process.

JUSTIFICACIÓN, ALCANCE Y OBJETIVOS

En nuestros días la función del ejercicio físico moderado como promotor de salud física, mental y emocional no ofrece dudas, lo que ya ha sido co6ntrastado científicamente en población gestante sana, mejorando incluso ciertos parámetros relevantes del proceso de embarazo y parto. Un cuerpo importante de la literatura científica genera días tras día nuevas evidencias que colocan al ejercicio físico moderado durante el embarazo como una herramienta de promoción para la salud y calidad de vida de la mujer gestante, especialmente recomendable como una pauta obstétrica protocolaria por parte de los responsables sanitarios. La publicación de un modelo universal de ejercicio físico gestacional, válido para ser implementado en toda gestante que no presente contraindicaciones obstétricas es un buen ejemplo de este continuo avance.

Sin embargo, tanto a nivel mundial como en el caso de España, la prevalencia de actividad física durante el embarazo es alarmadoramente baja (15-20%), lo que nos obliga a plantear soluciones que de alguna manera promuevan en todos los colectivos implicados (instituciones, profesionales, población gestante) el concepto de embarazo físicamente activo como un factor básico de desarrollo sanitario y social. La Guía de Práctica Clínica (GPC) es un excelente elemento para poner en práctica esa necesaria promoción del citado concepto como una herramienta básica para cuidado y mejora de la calidad de vida de la mujer gestante, y por ende de su salud y la de su hijo/a.

Son por tanto Objetivos Generales de esta GPC:

- Generar un conjunto de recomendaciones basadas en la evidencia científica que, por medio de la actividad física durante la gestación, actúen como factores de prevención de posibles complicaciones y alteraciones del proceso de embarazo y parto.
- Mejorar la atención sanitaria-asistencial de la mujer gestante.
- Promover el concepto de embarazo físicamente activo como un elemento favorecedor del bienestar materno, fetal y del recién nacido/a.

Siendo Objetivos Específicos:

- Lograr la mejora de los resultados pre, peri y postnatales a través de recomendaciones relativas a la actividad física gestacional, dentro del entorno hospitalario.

- Avanzar en el planteamiento de nuevas investigaciones que cubran todos los escenarios posibles para el mantenimiento de un embarazo físicamente activo.

Especial atención merecen aquellas gestantes que presenten algún tipo de contraindicación obstétrica para la actividad física durante el embarazo, un colectivo tradicional e históricamente olvidado en relación a posibles alternativas de movimiento. Esta GPC y sus correspondientes "Recomendaciones en el contexto de investigación", llaman la atención acerca de la urgente necesidad de estudios de investigación que examinen diferentes programas de movilidad física para estas situaciones, además de proveer algún tipo de alternativa segura y que, de forma transitoria, ayude a promover un nivel mínimo de movilidad de estas mujeres.

En estas situaciones, debido en gran medida a la escasa evidencia científica existente, resulta especialmente determinante la Toma de Decisiones Compartida (TDC) entre el/la profesional sanitario/a y el/la paciente ante una determinada intervención, como la actividad física durante la gestación con contraindicaciones obstétricas. En este contexto cobra especial protagonismo la aportación de la GPC, impulsando las Herramientas de Ayuda a la Toma de Decisiones Compartidas (HATDC) como un elemento básico y conductor en la relación profesional/paciente.

Por lo tanto, la presente GPC va dirigida a profesionales del ámbito sanitario (especialmente de la Obstetricia), los de las Ciencias de la Actividad Física y del Deporte y naturalmente al colectivo de mujeres gestantes como población diana (Fig 2).

Figura 2: Destinatarios de la GPC sobre la actividad física durante el embarazo

JUSTIFICATION, SCOPE AND OBJECTIVES

Nowadays, the role of moderate physical exercise as a promoter of physical, mental and emotional health has been scientifically proven in a healthy pregnant population, even improving certain relevant parameters of the pregnancy and childbirth process.

An important body of scientific literature generates day after day new evidence that reports moderate physical exercise during pregnancy as a tool to promote health and quality of life of pregnant women, this is especially applicable as a protocol obstetric indication by health care providers. The recent publication of a universal model of gestational physical exercise, valid for implementation in all pregnant women who do not present obstetric contraindications, is a good example of this continuous advance.

However, both worldwide and in Spain, the prevalence of physical activity during pregnancy is alarmingly low (15-20%), which makes it necessary to propose solutions that promote the concept of physically active pregnancy as a basic factor of health and social development in all the groups involved (institutions, professionals, pregnant population). The Clinical Practice Guideline (CPG) is an excellent element for developing this necessary promotion of the aforementioned concept as a basic tool for the care and improvement of the quality of life of the pregnant woman and her child.

Therefore, the general objectives of this CPG are as follows:

- To generate a set of recommendations based on scientific evidence that, through physical activity during gestation, act as factors in the prevention of possible complications and alterations in the pregnancy and childbirth process.
- To improve the health care of pregnant women.
- To promote the concept of physically active pregnancy as an element favoring maternal, fetal and newborn well-being.

Specific Objectives:

- To achieve improved pre-, peri- and postnatal outcomes through recommendations regarding gestational physical activity, within the hospital setting.
- To advance in the approach of new research that covers all possible scenarios for the maintenance of a physically active pregnancy.

This CPG pays special attention to pregnant women with obstetric contraindications for physical activity during pregnancy, a traditional and historically forgotten group regarding physical activity. The "Recommendations in the context of research" of this CPG focus on the urgent need for research studies that examine different physical mobility programs for these situations, in addition to providing safe alternatives that, temporarily, favor a minimum level of mobility for these pregnant women.

In these situations, largely due to the scarce scientific evidence available, Shared Decision Making (SDM) between the health professional and the patient is particularly important when faced with a specific intervention, such as physical activity during pregnancy with obstetric contraindications. In this context, the contribution of CPG takes on special importance, promoting the Shared Decision-Making Tools (SDMT) as a basic and guiding element in the professional/patient relationship.

Therefore, this CPG is aimed at health professionals (especially in Obstetrics), Physical Activity and Sport Sciences and, of course, at pregnant women as a target population (Fig. 2).

Figure 2: Final beneficiaries of the CPG for physical activity throughout pregnancy.

GRUPO DE ELABORACIÓN DE LA GUÍA (GEG)

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Ane Uria Minguito. Doctoranda en Ciencias de la Actividad Física y del Deporte. UPM

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Gabriela De Roia. Universidad de Flores. Argentina.

Rocío Montejo Rodriguez. University of Gotemburg. Sweden

FORMULACIÓN DE PREGUNTAS CLÍNICAS (PICO)

Preguntas PICO sobre Intervención			
¿En gestantes sanas se debe recomendar la actividad física moderada durante el embarazo para la mejora de los resultados pre, peri y posnatales?			
Paciente	**Intervención**	**Comparación**	**Desenlace/Resultados**
Gestante sana	Actividad física programada o autónoma	Cuidados habituales	Tabla consensuada
¿En gestantes sanas se debe recomendar la actividad física moderada durante el embarazo para la mejora de la calidad de vida de la mujer gestante?			
Paciente	**Intervención**	**Comparación**	**Desenlace/Resultados**
Gestante sana	Actividad física programada o autónoma	Cuidados habituales	Tabla consensuada
¿Es el ejercicio físico programado y supervisado durante el embarazo más eficaz que la actividad física autónoma desarrollada por la mujer gestante?			
Paciente	**Intervención**	**Comparación**	**Desenlace/Resultados**
Gestante sana	Ejercicio físico programado y supervisado	Actividad física autónoma	Tabla consensuada
¿En gestantes con situación de reposo hospitalario o domiciliario se debe recomendar algún tipo de actividad física moderada?			
Paciente	**Intervención**	**Comparación**	**Desenlace/Resultados**
Gestante con contraindicaciones obstétricas para la actividad física	Programa de ejercicios	No intervención	Tabla

PICO QUESTIONS FORMULATION

PICO Questions			
In healthy pregnant women, should moderate physical activity during pregnancy be recommended to improve pre-, peri- and postnatal outcomes?			
Patient	**Intervention**	**Comparation**	**Outcomes**
Healthy pregnant women	Supervised Exercise/Physical Activity	Usual obstetric health care	Table
In healthy pregnant women, should moderate physical activity during pregnancy be recommended to improve the quality of life of the pregnant woman?			
Patient	**Intervention**	**Comparation**	**Outcomes**
Healthy pregnant women	Supervised Exercise/Physical Activity	Usual obstetric health care	Table
Is supervised exercise during pregnancy more effective than autonomous physical activity performed by the pregnant woman?			
Patient	**Intervention**	**Comparation**	**Outcomes**
Healthy pregnant women	Supervised Exercise	Physical Activity	Table
Should any type of moderate physical activity be recommended for pregnant women on bed rest at hospital or home rest? (RRC)			
Patient	**Intervention**	**Comparation**	**Outcomes**
Pregnant with obstetric contraindications for physical activity	Supervised Exercise	No intervention	Table

TABLA DE RESULTADOS/DESENLACES CRÍTICOS

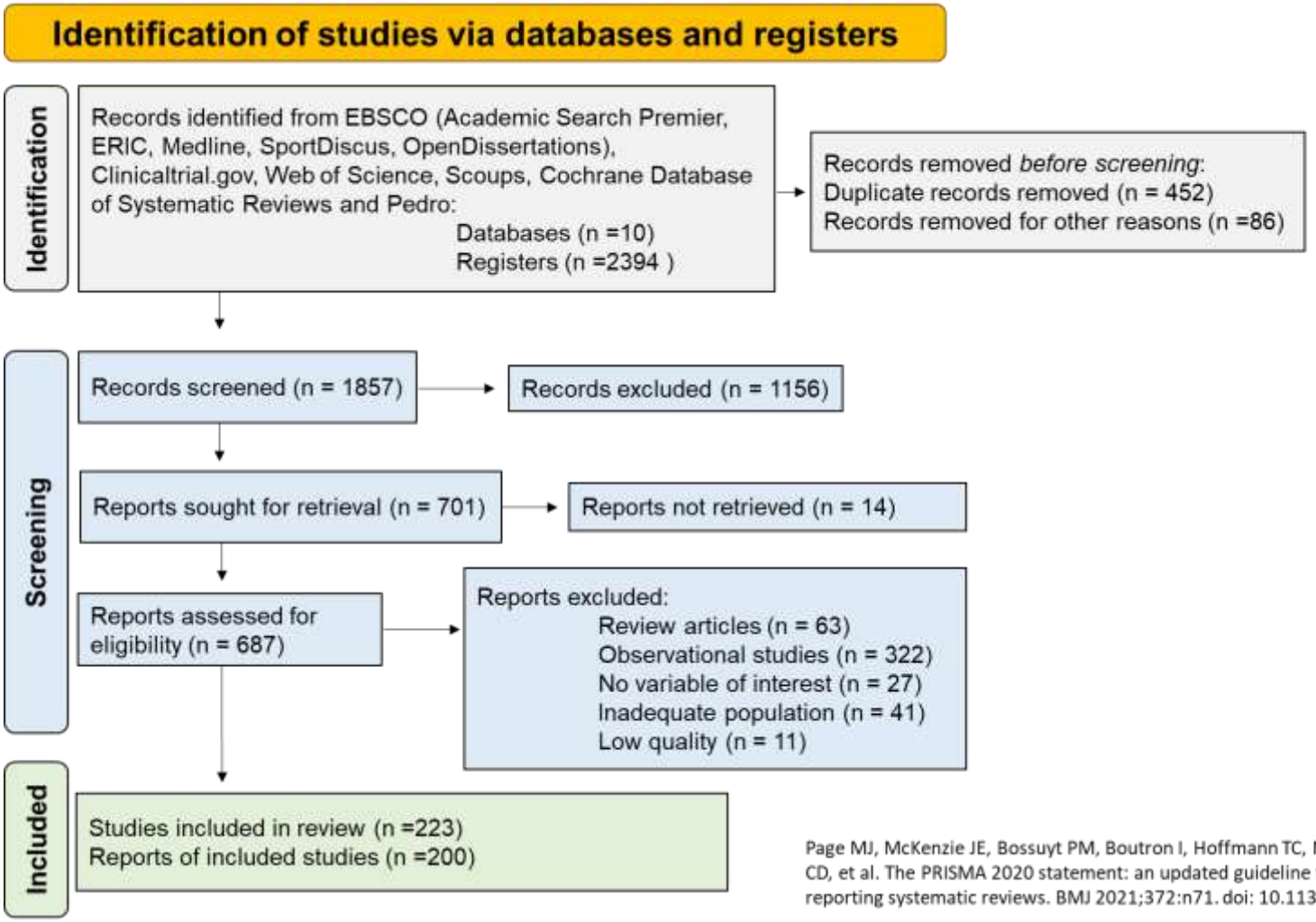
Se utilizará una recientemente publicada revisión sistemática con meta-análisis sobre diabetes gestacional, por ello se elimina el resultado de la tabla inicial. Salud mental y emocional se diversifica: se utilizarán dos revisiones sistemáticas con meta-análisis publicadas sobre depresión y ansiedad prenatal, respectivamente. Además, se realizarán dos revisiones sistemáticas con meta-análisis sobre calidad de vida y calidad de sueño. También se harán dos revisiones sistemáticas sobre dolor lumbar y dolor pélvico. Duración del parto se elimina.

TABLE OF CRITICAL OUTCOMES

A recently published systematic review with meta-analysis on gestational diabetes will be used, therefore the outcome of the initial table is eliminated. Mental and emotional health is diversified: two published systematic reviews with meta-analyses on prenatal depression and anxiety, respectively, will be used. In addition, two systematic reviews with meta-analyses on quality of life and quality of sleep will be carried out. There will also be two systematic reviews on low back pain and pelvic pain. Duration of labor is removed.

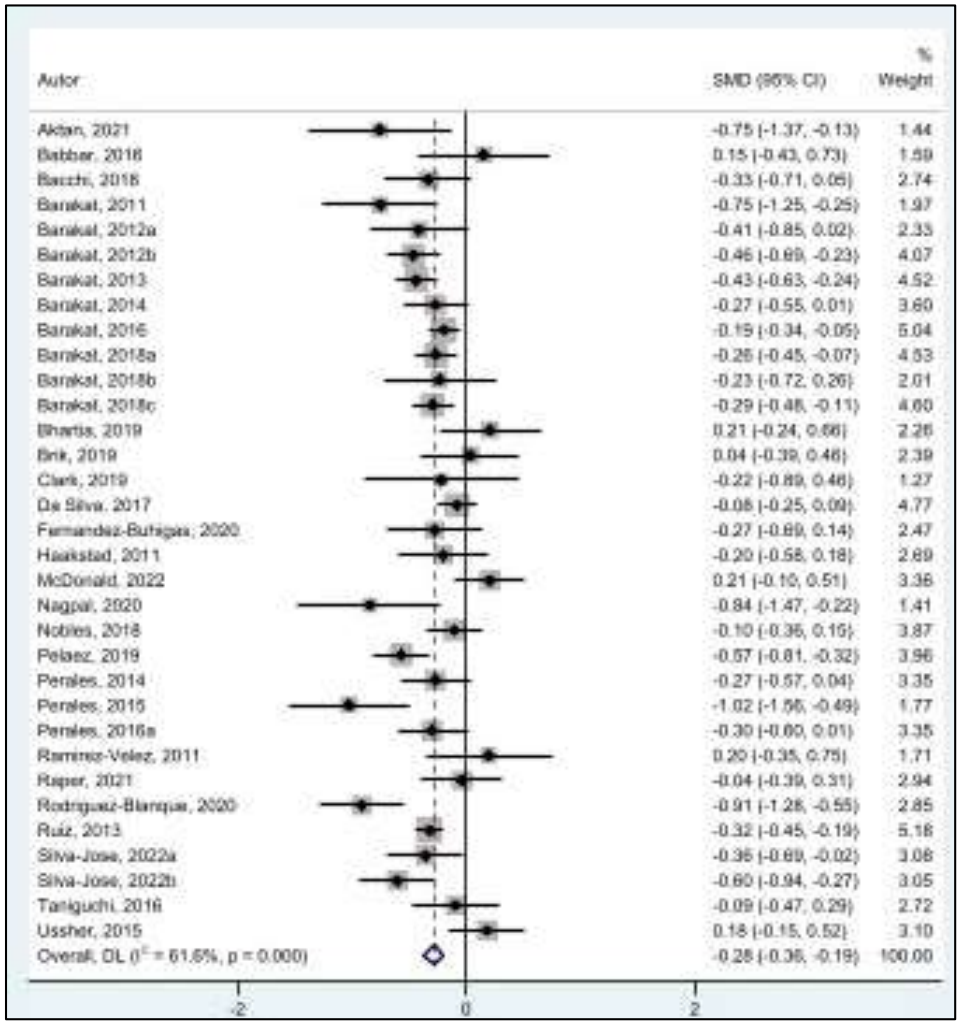
Desenlaces-Resultados / Outcomes	
1	Enfermedad hipertensiva del embarazo / Hypertensive pregnancy disease/disorders
2	Ganancia de peso materno general y dependiendo de IMC pregestacional / General maternal weight gain and depending on pregestational BMI
3	Calidad de vida / Quality of life
4	Calidad de sueño / Sleep quality
5	Dolor lumbar / Low-back pain
6	Dolor pélvico / Pelvic girdle pain
7	Aborto / Abortion
8	Edad gestacional / Gestational age
9	Incontinencia urinaria/Suelo pélvico / Urinary incontinence/Pelvic floor
10	Tipo de parto / Type of delivery
11	Peso de nacimiento / Birthweight
12	Obesidad infantil / Childhood obesity
13	Complicaciones cardiovasculares y metabólicas del niño/a / Cardiovascular and metabolic complications in children
14	Reposo hospitalario en cama / Bed rest during pregnancy

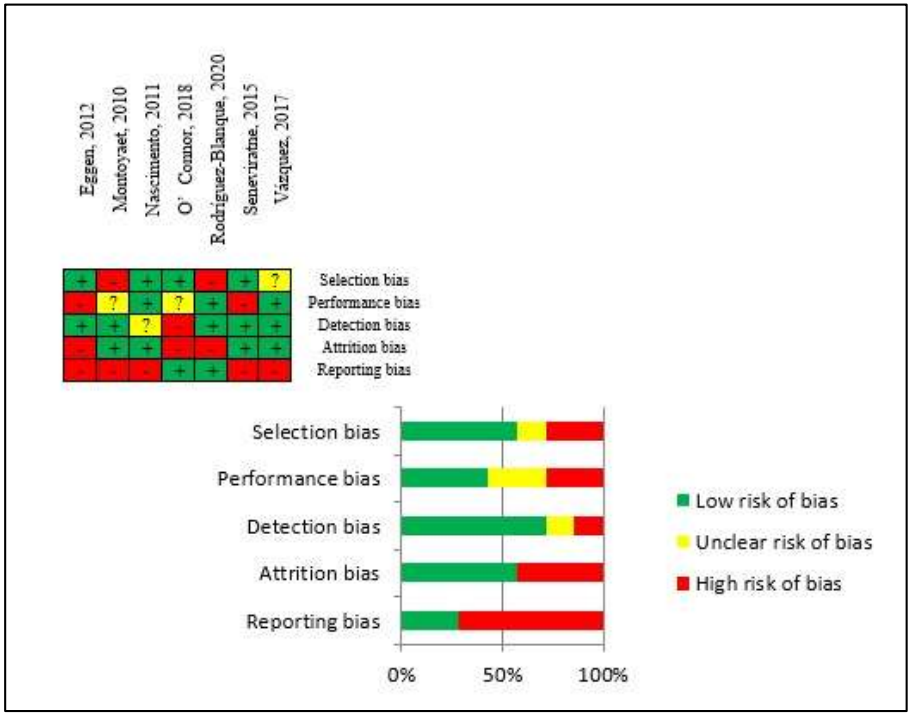
BÚSQUEDA Y SELECCIÓN DE LA EVIDENCIA/ SEARCH AND SELECTION OF EVIDENCE

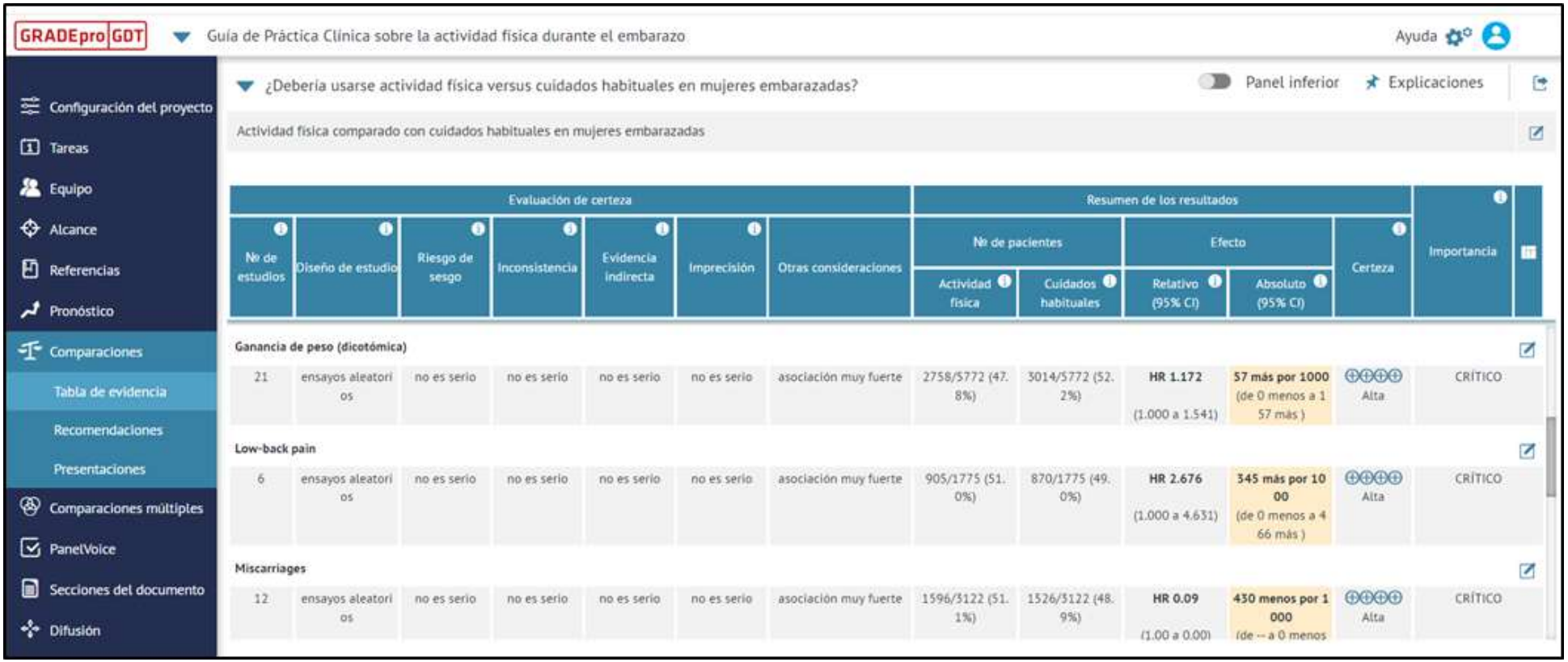


Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

EVALUACIÓN Y SÍNTESIS DE LA EVIDENCIA/ EVALUATION AND SYNTHESIS OF EVIDENCE






GRADEpro GDT
Guía de Práctica Clínica sobre la actividad física durante el embarazo
Ayuda
Configuración del proyecto
Tareas
Equipo
Alcance
Referencias
Pronóstico
Comparaciones
Tabla de evidencia
Recomendaciones
Presentaciones
Comparaciones múltiples
PanelVoice
Secciones del documento
Difusión
¿Debería usarse actividad física versus cuidados habituales en mujeres embarazadas?
Panel inferior
Explicaciones
Actividad física comparado con cuidados habituales en mujeres embarazadas
Evaluación de certeza
Resumen de los resultados
Nº de estudios
Diseño de estudio
Riesgo de sesgo
Inconsistencia
Evidencia indirecta
Imprecisión
Otras consideraciones
Nº de pacientes
Actividad física
Cuidados habituales
Efecto
Relativo (95% CI)
Absoluto (95% CI)
Certeza
Importancia
Ganancia de peso (dicotómica)
21 ensayos aleatorios no es serio no es serio no es serio no es serio asociación muy fuerte 2758/5772 (47.8%) 3014/5772 (52.2%) HR 1.172 (1.000 a 1.541) 57 más por 1000 (de 0 menos a 1 57 más) Alta CRÍTICO
Low-back pain
6 ensayos aleatorios no es serio no es serio no es serio no es serio asociación muy fuerte 905/1775 (51.0%) 870/1775 (49.0%) HR 2.676 (1.000 a 4.631) 345 más por 1000 (de 0 menos a 466 más) Alta CRÍTICO
Miscarriages
12 ensayos aleatorios no es serio no es serio no es serio no es serio asociación muy fuerte 1596/3122 (51.1%) 1526/3122 (48.9%) HR 0.09 (1.00 a 0.00) 430 menos por 1000 (de -- a 0 menos Alta CRÍTICO

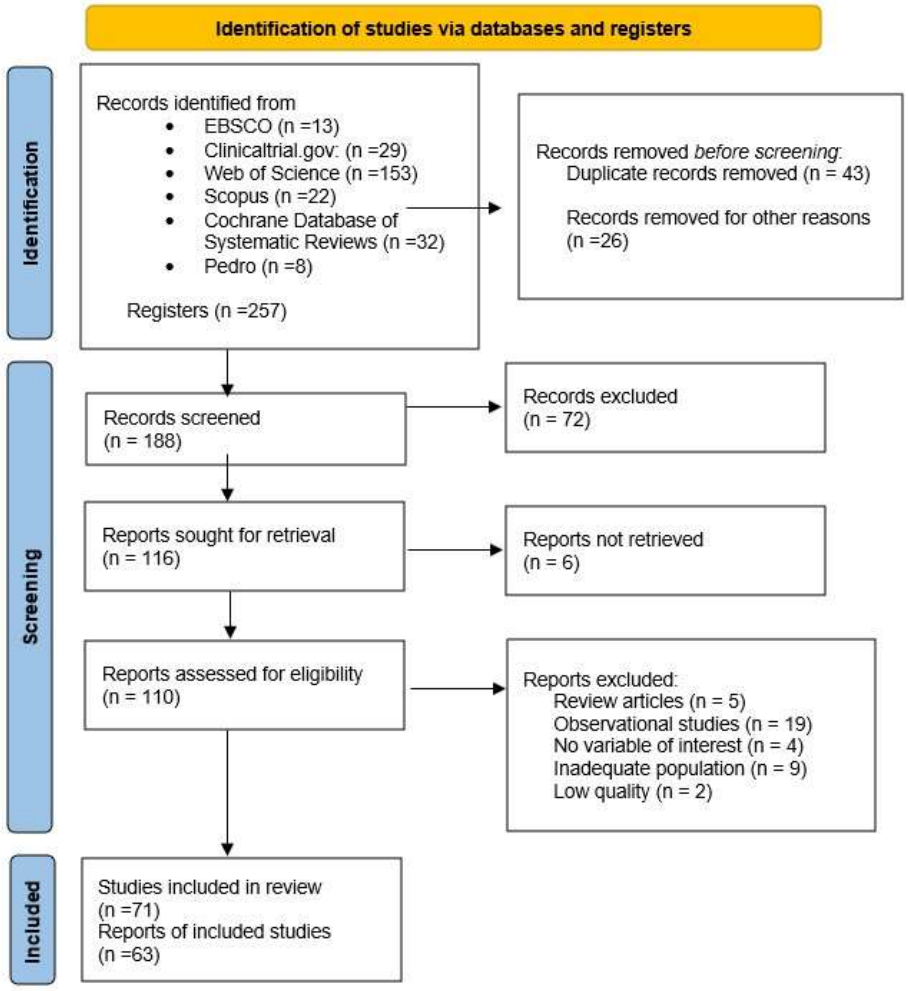
Enfermedad hipertensiva del embarazo / Hypertensive pregnancy disease/disorders

REPORT:

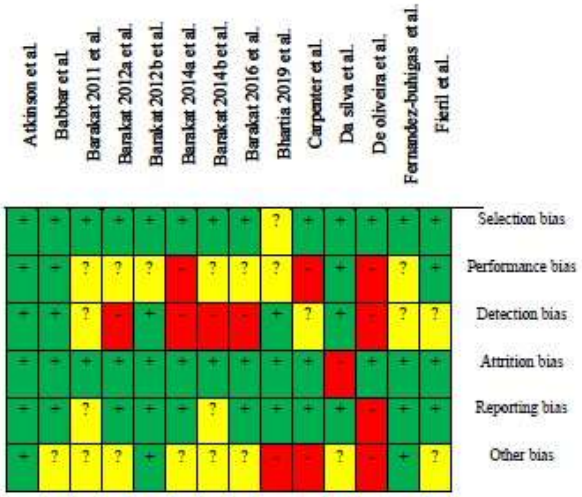
Table 1. PICOS Strategy

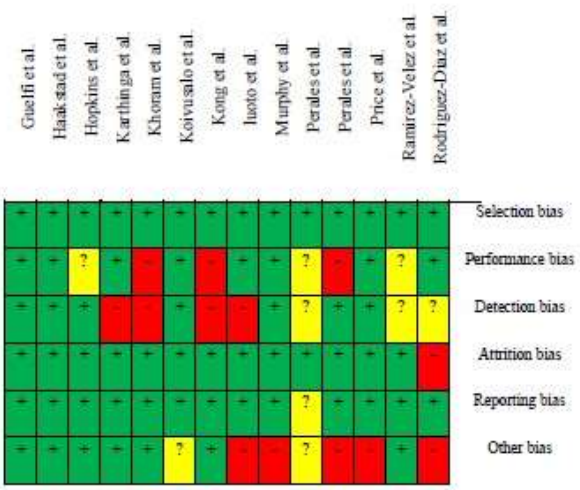
PICOS	DEFINITIONS
Population	pregnant women
Intervention	Interventions that include physical activity: • Individual/group • Autonomous/supervised • Face-to-face/online • Co-intervention (ex.: nutrition)
Comparison	Data based on non-practice of physical activity. • Intervention – non-intervention
Outcome	The main study variable
Study design	Randomized clinical trials

FLOW CHART:



RISK OF BIAS:


Atkinson et al.
Babbar et al.
Barakat 2011 et al.
Barakat 2012a et al.
Barakat 2012b et al.
Barakat 2014a et al.
Barakat 2014b et al.
Barakat 2016 et al.
Bhartia 2019 et al.
Carpenter et al.
Da silva et al.
De oliveira et al.
Fernandez-buhigas et al.
Fieril et al.
Selection bias
Performance bias
Detection bias
Attrition bias
Reporting bias
Other bias


Guelfi et al.
Haakstad et al.
Hopkins et al.
Karthinga et al.
Khoram et al.
Koivusalo et al.
Kong et al.
Isoto et al.
Murphy et al.
Perales et al.
Perales et al.
Price et al.
Ramirez-Velez et al.
Rodriguez-Diaz et al.
Selection bias
Performance bias
Detection bias
Attrition bias
Reporting bias
Other bias


Ruiz et al.
Saucedal et al.
Silva-Jose et al.
Skow et al.
Stafne et al.
Stutzman et al.
Taniguchi et al.
Tomic et al.
Ussher et al.
Vazquez-Lara et al.
Xu et al.
Yeo et al.
Selection bias
Performance bias
Detection bias
Attrition bias
Reporting bias
Other bias

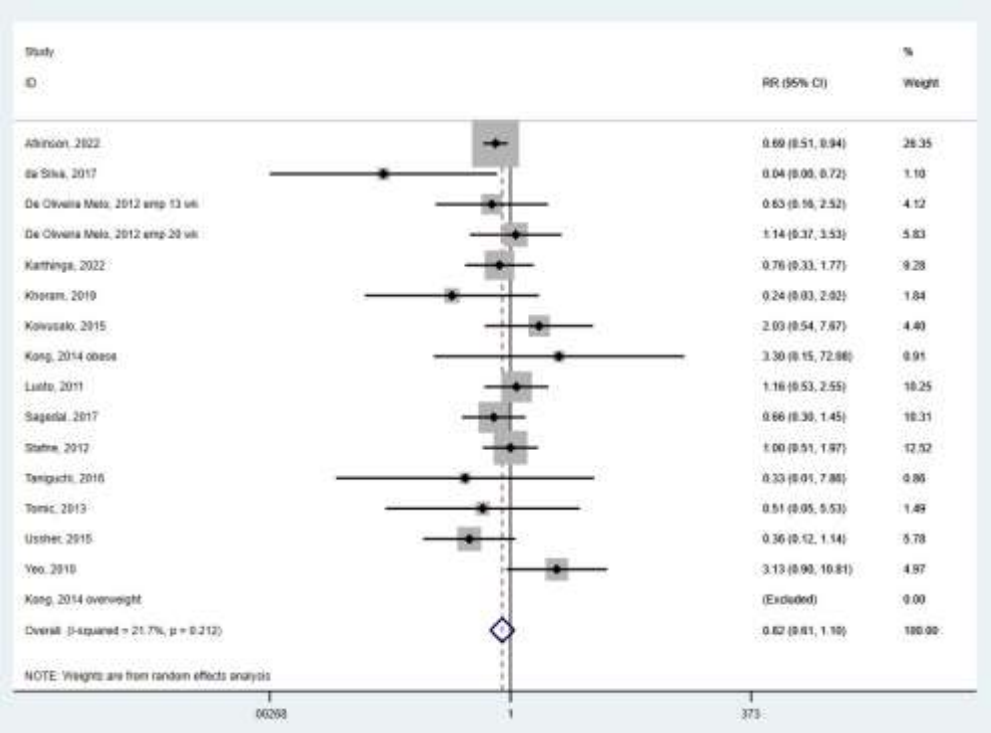
RESULTS:

Preeclampsia:

Study	RR	[95% Conf.	Interval]	% Weight
Atkinson, 2022	0.694	0.515	0.937	26.35
da Silva, 2017	0.044	0.003	0.722	1.10
De Oliveira Melo, 20	0.633	0.159	2.523	4.12
De Oliveira Melo, 20	1.140	0.368	3.529	5.83
Karthinga, 2022	0.764	0.329	1.775	9.28
Khoram, 2019	0.237	0.028	2.020	1.84
Koivusalo, 2015	2.025	0.535	7.667	4.40
Kong, 2014 obese	3.300	0.151	72.084	0.91
Luoto, 2011	1.160	0.528	2.549	10.25
Sagedal, 2017	0.664	0.303	1.455	10.31
Stafne, 2012	1.000	0.507	1.974	12.52
Taniguchi, 2016	0.327	0.014	7.858	0.86
Tomic, 2013	0.506	0.046	5.527	1.49
Ussher, 2015	0.365	0.117	1.135	5.78
Yeo, 2010	3.125	0.903	10.812	4.97
Kong, 2014 overweigh	(Excluded)			
D+L pooled RR	0.819	0.608	1.104	100.00

Heterogeneity chi-squared = **17.88** (d.f. = **14**) p = **0.212**
I-squared (variation in RR attributable to heterogeneity) = **21.7%**
Estimate of between-study variance Tau-squared = **0.0644**

Test of RR=1 : z= **1.31** p = **0.190**

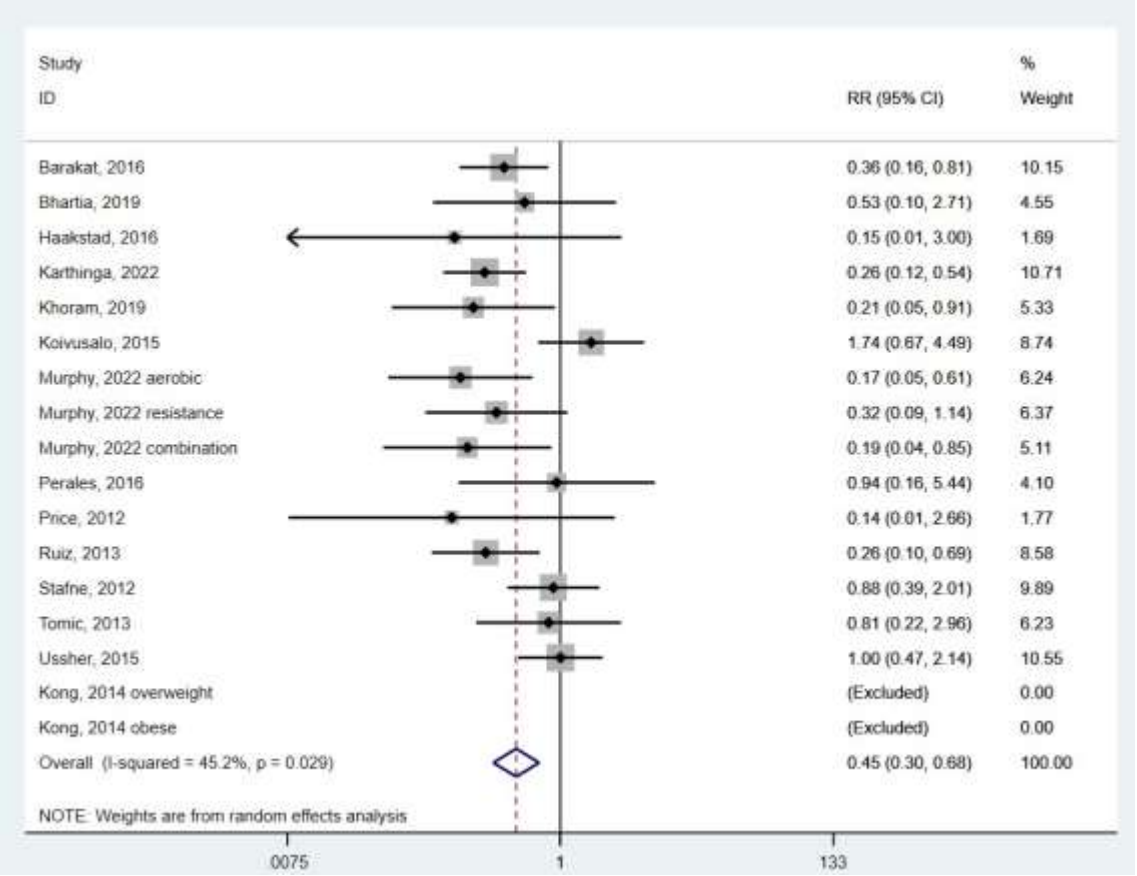


Hypertensive disorders:

Study	RR	[95% Conf.	Interval]	% Weight
Barakat, 2016	0.365	0.164	0.809	10.15
Bhartia, 2019	0.526	0.102	2.709	4.55
Haakstad, 2016	0.150	0.008	2.998	1.69
Karthinga, 2022	0.258	0.123	0.540	10.71
Khoram, 2019	0.211	0.049	0.909	5.33
Koivusalo, 2015	1.736	0.671	4.490	8.74
Murphy, 2022 aerobic	0.167	0.046	0.608	6.24
Murphy, 2022 resista	0.318	0.089	1.137	6.37
Murphy, 2022 combina	0.189	0.042	0.855	5.11
Perales, 2016	0.938	0.162	5.439	4.10
Price, 2012	0.143	0.008	2.655	1.77
Ruiz, 2013	0.263	0.100	0.692	8.58
Stafne, 2012	0.883	0.388	2.011	9.89
Tomic, 2013	0.810	0.221	2.962	6.23
Ussher, 2015	1.003	0.471	2.135	10.55
Kong, 2014 overweigh	(Excluded)			
Kong, 2014 obese	(Excluded)			
D+L pooled RR	0.454	0.301	0.684	100.00

Heterogeneity chi-squared = **25.56** (d.f. = **14**) p = **0.029**
I-squared (variation in RR attributable to heterogeneity) = **45.2%**
Estimate of between-study variance Tau-squared = **0.2683**

Test of RR=1 : z= **3.77** p = **0.000**

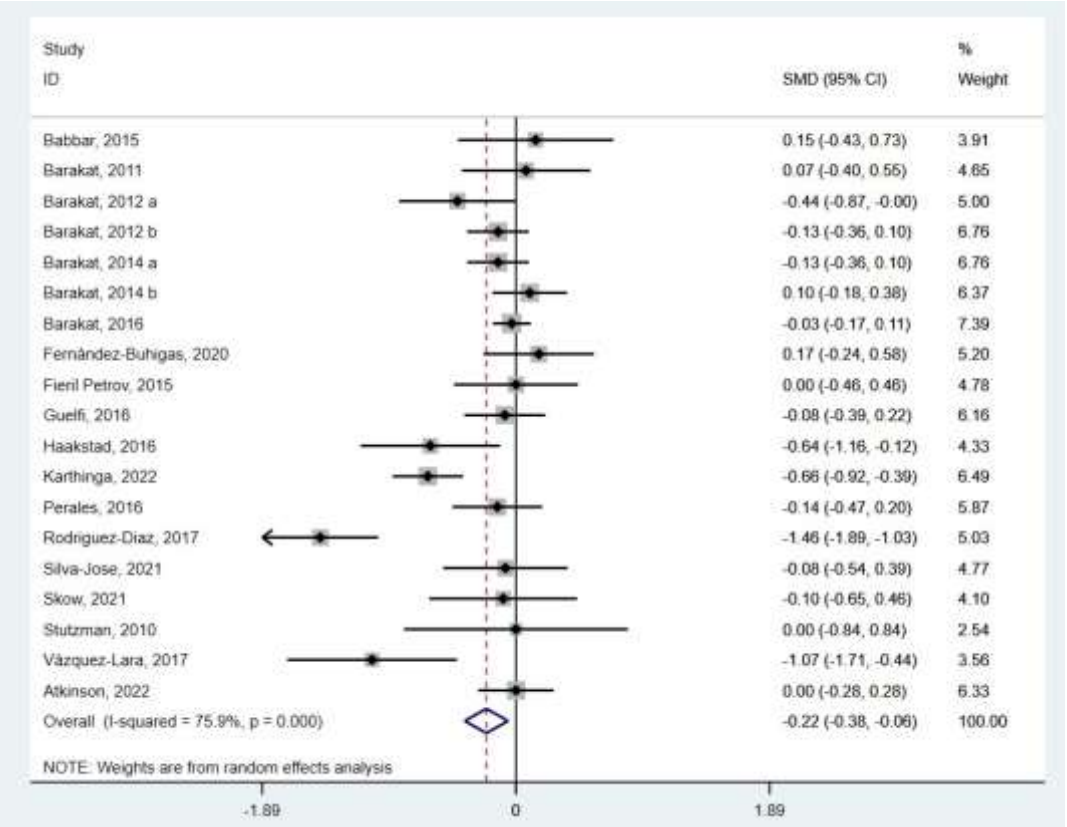


SBP final:

Study	SMD	[95% Conf.	Interval]	% Weight
Babbar, 2015	0.147	-0.432	0.725	3.91
Barakat, 2011	0.075	-0.404	0.554	4.65
Barakat, 2012 a	-0.436	-0.872	-0.000	5.00
Barakat, 2012 b	-0.134	-0.365	0.097	6.76
Barakat, 2014 a	-0.134	-0.365	0.097	6.76
Barakat, 2014 b	0.103	-0.175	0.381	6.37
Barakat, 2016	-0.031	-0.173	0.111	7.39
Fernández-Buhigas,	0.170	-0.241	0.582	5.20
Fieril Petrov, 2015	0.000	-0.463	0.463	4.78
Guelfi, 2016	-0.083	-0.385	0.218	6.16
Haakstad, 2016	-0.639	-1.160	-0.119	4.33
Karthinga, 2022	-0.658	-0.921	-0.394	6.49
Perales, 2016	-0.139	-0.473	0.195	5.87
Rodriguez-Diaz, 2017	-1.460	-1.892	-1.028	5.03
Silva-Jose, 2021	-0.079	-0.543	0.385	4.77
Skow, 2021	-0.096	-0.648	0.456	4.10
Stutzman, 2010	0.000	-0.836	0.836	2.54
Vázquez-Lara, 2017	-1.073	-1.706	-0.440	3.56
Atkinson, 2022	0.000	-0.282	0.282	6.33
D+L pooled SMD	-0.221	-0.383	-0.059	100.00

Heterogeneity chi-squared = **74.78** (d.f. = **18**) p = **0.000**
I-squared (variation in SMD attributable to heterogeneity) = **75.9%**
Estimate of between-study variance Tau-squared = **0.0871**

Test of SMD=0 : z= **2.67** p = **0.008**

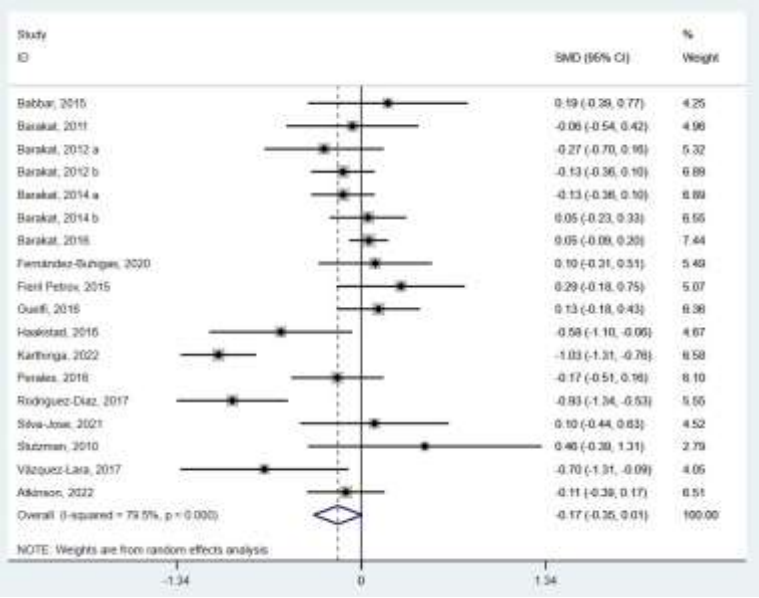


DBP final:

Study	SMD	[95% Conf.	Interval]	% Weight
Babbar, 2015	0.193	-0.387	0.772	4.25
Barakat, 2011	-0.064	-0.543	0.415	4.96
Barakat, 2012 a	-0.270	-0.702	0.163	5.32
Barakat, 2012 b	-0.133	-0.363	0.098	6.89
Barakat, 2014 a	-0.133	-0.363	0.098	6.89
Barakat, 2014 b	0.048	-0.230	0.326	6.55
Barakat, 2016	0.054	-0.088	0.195	7.44
Fernández-Buhigas,	0.101	-0.310	0.512	5.49
Fieril Petrov, 2015	0.287	-0.178	0.752	5.07
Guelfi, 2016	0.125	-0.177	0.427	6.36
Haakstad, 2016	-0.582	-1.100	-0.064	4.67
Karthinga, 2022	-1.034	-1.307	-0.761	6.58
Perales, 2016	-0.174	-0.508	0.161	6.10
Rodriguez-Diaz, 2017	-0.933	-1.337	-0.530	5.55
Silva-Jose, 2021	0.095	-0.444	0.635	4.52
Stutzman, 2010	0.460	-0.388	1.308	2.79
Vázquez-Lara, 2017	-0.702	-1.312	-0.092	4.05
Atkinson, 2022	-0.111	-0.393	0.171	6.51
D+L pooled SMD	-0.169	-0.345	0.008	100.00

Heterogeneity chi-squared = **82.94** (d.f. = **17**) p = **0.000**
I-squared (variation in SMD attributable to heterogeneity) = **79.5%**
Estimate of between-study variance Tau-squared = **0.1041**

Test of SMD=0 : z= **1.87** p = **0.061**



GRADE:

Evaluación de certeza							Resumen de los resultados					
Nº de estudios	Diseño de estudio	Riesgo de sesgo	Inconsistencia	Evidencia indirecta	Imprecisión	Otras consideraciones	Nº de pacientes: Actividad física	Nº de pacientes: Cuidados habituales	Efecto: Relativo (95% CI)	Efecto: Absoluto (95% CI)	Certeza	Importancia
Hypertensive disorders												
17	ensayos aleatorios	no es serio	no es serio	no es serio	no es serio	fuerte asociación gradiente de dosis-respuesta	75/2277 (3.3%)	145/2172 (6.7%)	no estimable		⨁⨁⨁⨁ Alta	CRÍTICO

Informe ganancia de peso gestacional / Gestational weight gain report

Para el registro de esta revisión sistemática, la estrategia PICO fue la siguiente:

To register this systematic review, PICO strategy was:

- Población / Population: Inclusión: gestantes sanas, mayores de 18 años, sin contraindicaciones para el ejercicio físico, independientemente de su edad gestacional al ingreso al estudio. Las contraindicaciones absolutas incluyen: o Rotura de membranas, parto prematuro. o Sangrado persistente en el segundo o tercer trimestre/placenta previa. o Hipertensión inducida por el embarazo o preeclampsia. o Cuello uterino incompetente. o Restricción del crecimiento intrauterino. o Embarazo de alto orden.
    - Diabetes tipo 1 no controlada, hipertensión o enfermedad tiroidea, otros trastornos cardiovasculares, respiratorios o sistémicos graves

Inclusion: healthy pregnant women, aged above 18 years old, with no contraindications for physical exercise, regardless of their gestational age at the time of study entry. Absolute contraindications include:

    - Ruptured membranes, premature labour. o Persistent second or third trimester bleeding/placenta previa. o Pregnancy-induced hypertension or pre-eclampsia. o Incompetent cervix.
    - Intrauterine growth restriction. o High-order pregnancy.
    - Uncontrolled Type 1 diabetes, hypertension or thyroid disease, other serious cardiovascular, respiratory or systemic disorder
- Intervención / Intervention: La intervención objetivo estará relacionada con los diferentes modelos que incluyen cualquier formato de actividad física durante el embarazo (individual/grupal), (autónomo/supervisado), (presencial/online) (ejercicio agudo y crónico) y co-intervenciones (por ejemplo, nutrición). Se registrará la Intensidad, duración, frecuencia, tipo de ejercicio, trimestre de duración del embarazo y adherencia al programa. / The target intervention will be related to the different models that include any format of physical activity during pregnancy (individual/group), (autonomous/supervised), (face-toface/online) (acute and chronic exercise) and co-interventions (e.g., nutrition). It will be recorded the Intensity, duration, frequency, type of exercise, trimester

of pregnancy duration and adherence to the program

- Comparación / Comparison: La comparación se basará en la no práctica de actividad física considerando el grupo de no intervención de los estudios seleccionados. Además, incluiremos otras revisiones sistemáticas para comparar otros resultados de estas variables con los nuestros. / The comparison will be based on not practicing physical activity considering the non-intervention group of the selected studies. Also, we will include other systematic reviews to compare other outcomes of these variables with ours.
- Variables / Outcomes: El resultado primario será la evaluación de ganancia de peso gestacional en función del IMC pregestacional durante el embarazo. / The primary

outcome will be the assessment of gestational weight gain depending on pregestational BMI during pregnancy.

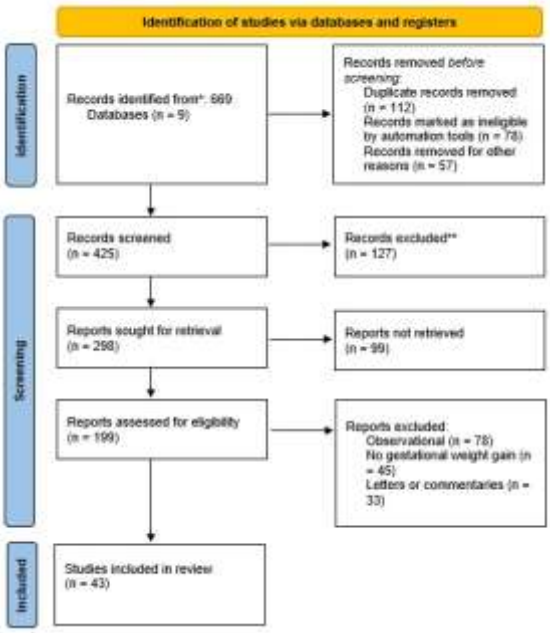
Se realizó una exhaustiva búsqueda para analizar los efectos de intervenciones incluyendo algún tipo de actividad física en la ganancia de peso gestacional en comparación con un grupo que no realizó esta intervención, en las siguientes bases de datos:

A comprehensive search was performed to analyze the effects of interventions including any physical activity type on gestational weight gain in comparison with a group that didn't realize this intervention, on the following databases:

- EBSCO o Academic Search Premier. o ERIC. o MEDLINE. o SPORTDiscus. o OpenDissertations. - Clinicaltrials.gov - Web of Science.
- Scopus.
- Cochrane Database of Systematic Reviews.

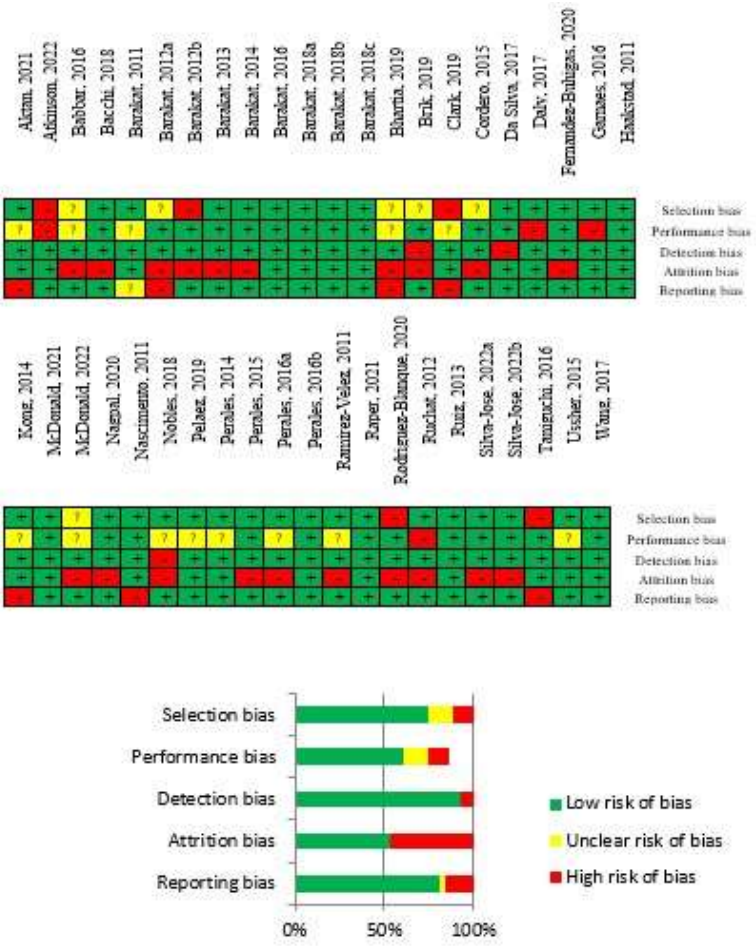
Los resultados de la búsqueda se observan en el siguiente Flowchart:

The search results are displayed in the next Flowchart:



Cumpliendo con los requerimientos de la búsqueda, 43 artículos fueron seleccionados. Los artículos midieron la ganancia de peso gestacional en 2 grupos de estudio a través de media y desviación típica, o ganancia excesiva de peso. Así mismo, un riguroso análisis del riesgo de sesgo fue realizado, cuyos resultados pueden observarse en la siguiente figura:

Fulfilling the search requirements, 43 articles were selected. The articles measured gestational weight gain in 2 study groups through mean and standard deviation, or excessive weight gain. Likewise, a rigorous bias risk analysis was performed, the results of which can be seen in the following figure:

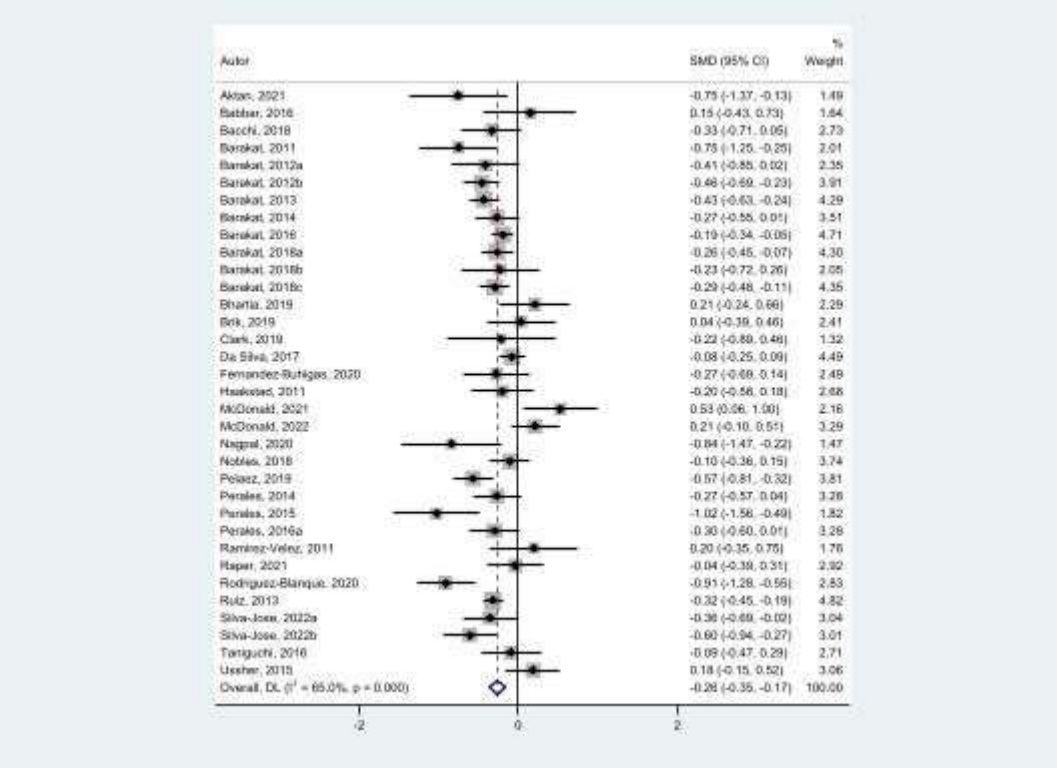


Tras la realización del riesgo de sesgo, se procedió al análisis de la calidad de la evidencia (GRADE), cuyo resultado fue:

After risk of bias assessment, the quality of evidence analysis (GRADE) was made, and the result was:

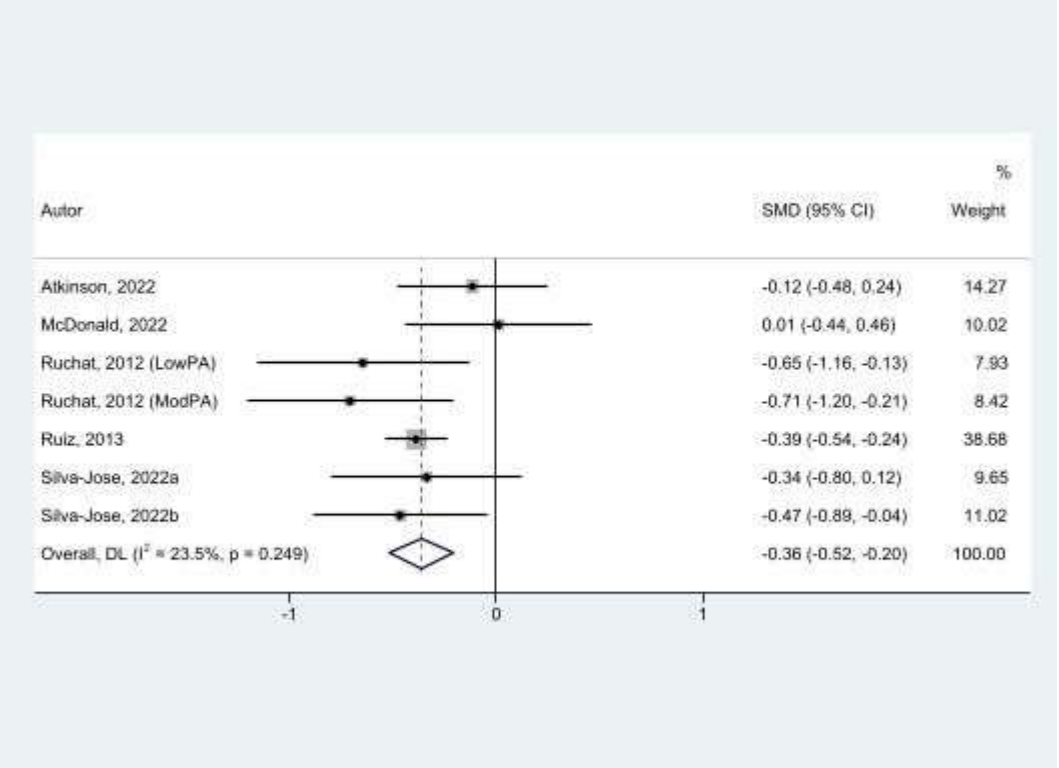
Por último, 34 estudios fueron incluidos en el meta-análisis, analizando las ganancias globales de peso gestacional. Los resultados revelaron una asociación negativa entre el grupo de intervención durante el embarazo y la ganancia de peso gestacional (ES = -0.261, 95% CI = -0.350, -0.172, I^2 = 65.0%, $P_{heterogeneidad}$ = 0.000). Este análisis se muestra en la siguiente figura:

Finnaly, 4 studies were included in the meta-analysis. Results revealed a negative association between intervention group during pregnancy and gestational weight gain (-0.261, 95% CI = -0.350, -0.172, I^2 = 65.0%, $P_{heterogeneity}$ = 0.000). This analysis is shown in the next figure:



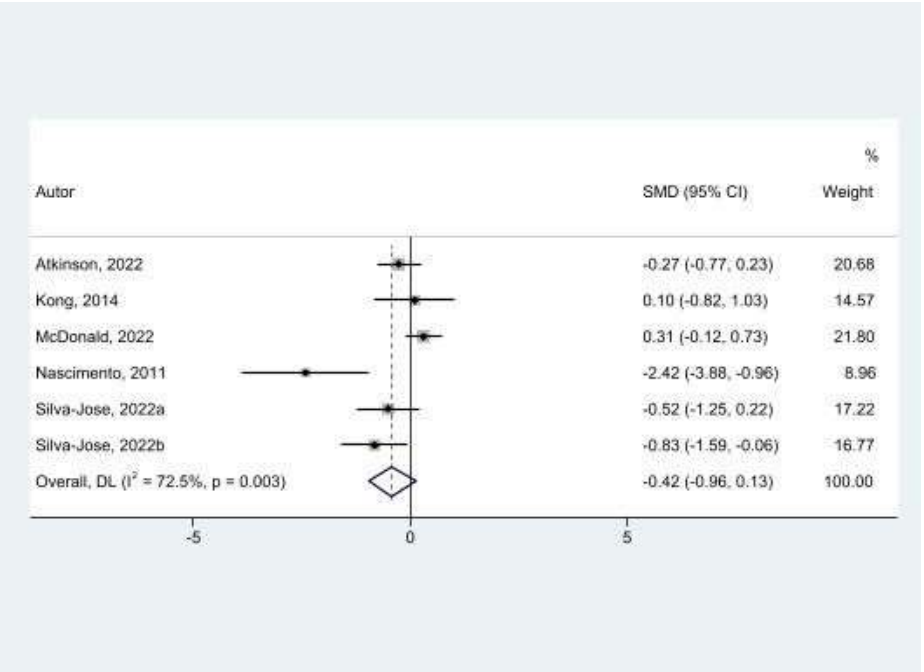
Además, 6 artículos estuvieron incluidos en el análisis de las ganancias de peso gestacional en mujeres cuyo IMC pregestacional fue normopeso. Los resultados revelaron una asociación negativa entre el grupo de intervención durante el embarazo y la ganancia de peso gestacional (ES = -0.360, 95% CI = -0.515, -0.205, I^2 = 23.5%, $P_{heterogeneidad}$ = 0.000). Este análisis se muestra en la siguiente figura:

Additionally, 6 articles were included in the analysis of gestational weight gains in women whose pregestational BMI was normal weight. The results revealed a negative association between the intervention group during pregnancy and gestational weight gain (ES = -0.360, 95% CI = -0.515, -0.205, I2 = 23.5%, $P_{heterogeneity}$ = 0.000). This analysis is shown in the following figure:



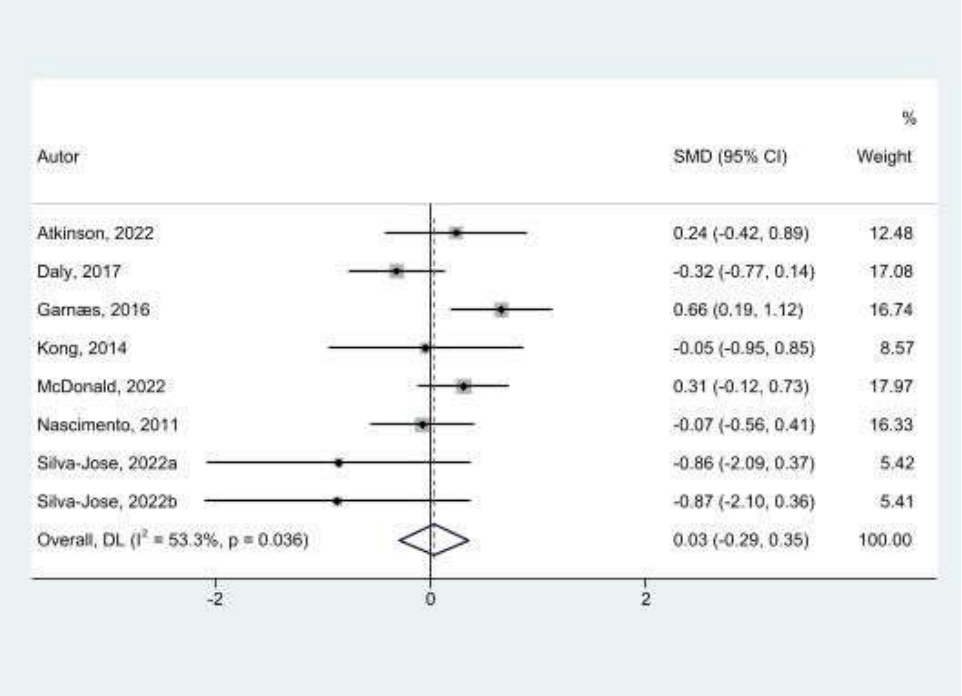
Por otro lado, 6 artículos compusieron el análisis de las ganancias de peso gestacional en mujeres cuyo IMC pregestacional fue sobrepeso. Los resultados revelaron una asociación negativa entre el grupo de intervención durante el embarazo y la ganancia de peso gestacional (ES = -0.419, 95% CI = -0.964, -0.127, I^2 = 72.5%, $P_{heterogeneidad}$ = 0.133). Este análisis se muestra en la siguiente figura:

On the other hand, 6 articles composed the analysis of gestational weight gains in women whose pre-gestational BMI was overweight. The results revealed a negative association between the intervention group during pregnancy and gestational weight gain (ES = -0.419, 95% CI = -0.964, -0.127, I2 = 72.5%, $P_{heterogeneity}$ = 0.133). This analysis is shown in the following figure:



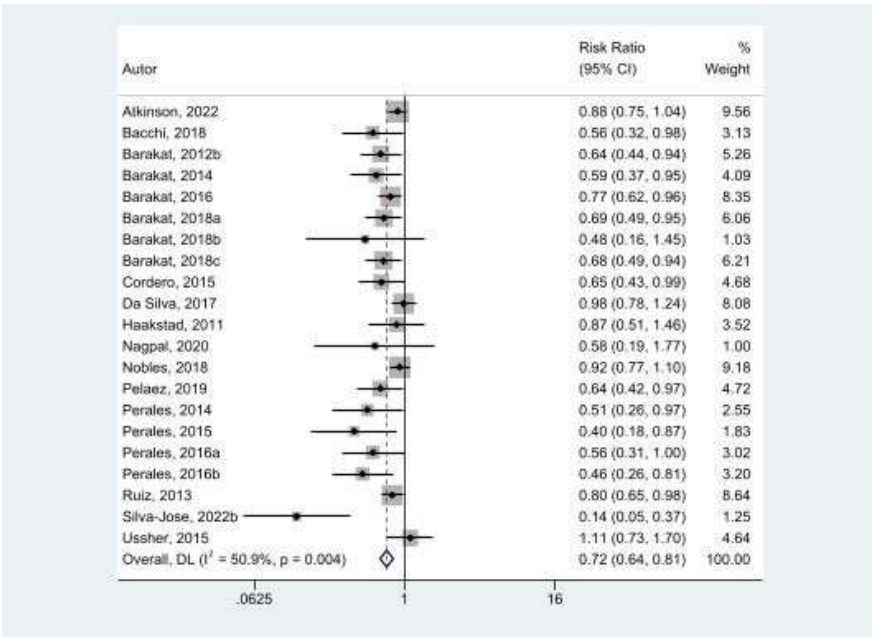
Para las mujeres cuyo IMC pregestacional fue obesidad, 8 artículos estuvieron incluidos en el meta-análisis. Los resultados revelaron una asociación negativa entre el grupo de intervención durante el embarazo y la ganancia de peso gestacional (ES =
0.031, 95% CI = -0.292, 0.353, I^2 = 53.3%, $P_{heterogeneidad}$ = 0.851). Este análisis se muestra en la siguiente figura:

For women whose pregestational BMI was obese, 8 articles were included in the metaanalysis. The results revealed a negative association between the intervention group during pregnancy and gestational weight gain (ES = 0.031, 95% CI = -0.292, 0.353, I2 =
53.3%, $P_{heterogeneity}$ = 0.851). This analysis is shown in the following figure:



Las excesivas ganancias de peso se analizaron en el meta-análisis incluyendo 21 artículos. Los resultados revelaron menores excesos de ganancia de peso en el grupo de intervención durante el embarazo (RR = 0.721, 95% CI = 0.641, 0.810, I^2 = 50.9%, $P_{heterogeneidad}$ = 0.000). Este análisis se muestra en la siguiente figura:

Excessive weight gains were analyzed in the meta-analysis including 21 articles. The results revealed less excess weight gain in the intervention group during pregnancy (RR
= 0.721, 95% CI = 0.641, 0.810, I2 = 50.9%, $P_{heterogeneity}$ = 0.000). This analysis is shown in the following figure:



Informe calidad de vida / Quality of life report

Para el registro de esta revisión sistemática, la estrategia PICO fue la siguiente:

To register this systematic review, PICO strategy was:

- Población / Population: Inclusión: gestantes sanas, mayores de 18 años, sin contraindicaciones para el ejercicio físico, independientemente de su edad gestacional al ingreso al estudio. Las contraindicaciones absolutas incluyen: o Rotura de membranas, parto prematuro. o Sangrado persistente en el segundo o tercer trimestre/placenta previa. o Hipertensión inducida por el embarazo o preeclampsia. o Cuello uterino incompetente. o Restricción del crecimiento intrauterino. o Embarazo de alto orden.
  - o Diabetes tipo 1 no controlada, hipertensión o enfermedad tiroidea, otros trastornos cardiovasculares, respiratorios o sistémicos graves

Inclusion: healthy pregnant women, aged above 18 years old, with no contraindications for physical exercise, regardless of their gestational age at the time of study entry. Absolute contraindications include:

- o Ruptured membranes, premature labour. o Persistent second or third trimester bleeding/placenta previa. o Pregnancy-induced hypertension or pre-eclampsia. o Incompetent cervix.
  - o Intrauterine growth restriction. o High-order pregnancy.
  - o Uncontrolled Type 1 diabetes, hypertension or thyroid disease, other serious cardiovascular, respiratory or systemic disorder
- Intervención / Intervention: La intervención objetivo estará relacionada con los diferentes modelos que incluyen cualquier formato de actividad física durante el embarazo (individual/grupal), (autónomo/supervisado), (presencial/online) (ejercicio agudo y crónico) y co-intervenciones (por ejemplo, nutrición). Se registrará la Intensidad, duración, frecuencia, tipo de ejercicio, trimestre de duración del embarazo y adherencia al programa. / The target intervention will be related to the different models that include any format of physical activity during pregnancy (individual/group), (autonomous/supervised), (face-toface/online) (acute and chronic exercise) and co-interventions (e.g., nutrition). It will be recorded the Intensity, duration, frequency, type of exercise, trimester of pregnancy duration and adherence to the program
- Comparación / Comparison: La comparación se basará en la no práctica de actividad física considerando el grupo de no intervención de los estudios seleccionados. Además, incluiremos otras revisiones sistemáticas para comparar otros resultados de estas variables con los nuestros. / The comparison will be based on not practicing physical activity considering the non-intervention group of the selected studies. Also, we will include other systematic reviews to compare other outcomes of these variables with ours.
- Variables / Outcomes: El resultado primario será la auto-percepción del estado de salud medido como un resultado de un cuestionario validado durante el embarazo. / Self-perception of health status measured as the result of a validated questionnaire during pregnancy will be the main outcome.

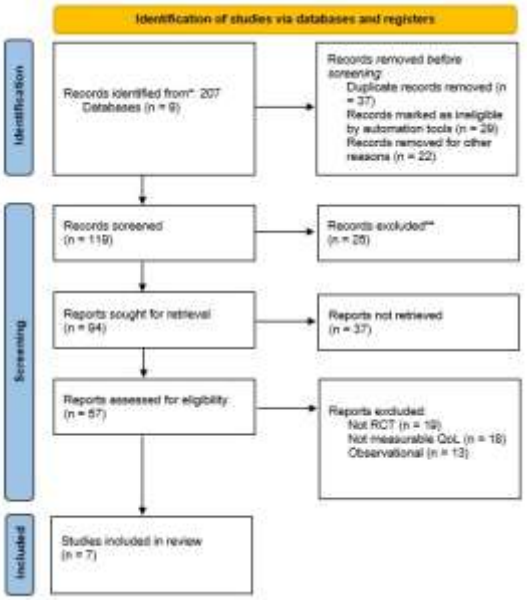
Se realizó una exhaustiva búsqueda para analizar los efectos de intervenciones incluyendo algún tipo de actividad física en la calidad de vida (medida a través de cuestionarios validados) en comparación con un grupo que no realizó esta intervención, en las siguientes bases de datos:

A comprehensive search was performed to analyze the effects of interventions including any physical activity type on quality of life (measured through validated questionnaires) in comparison with a group that didn't realize this intervention, on the following databases:

- EBSCO o Academic Search Premier. o ERIC. o MEDLINE. o SPORTDiscus.
o OpenDissertations. - Clinicaltrials.gov - Web of Science.
- Scopus.
- Cochrane Database of Systematic Reviews.

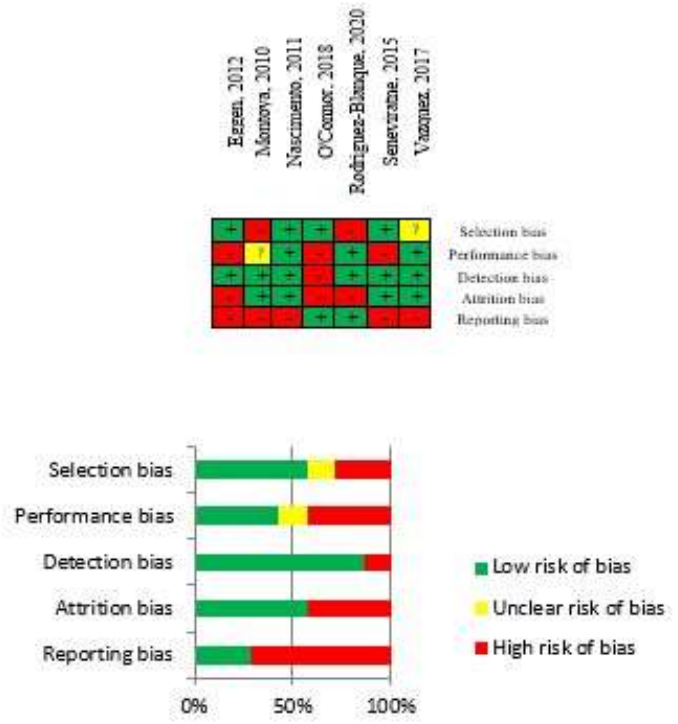
Los resultados de la búsqueda se observan en el siguiente Flowchart:

The search results are displayed in the next Flowchart:



Cumpliendo con los requerimientos de la búsqueda, 7 artículos fueron seleccionados. Los artículos midieron la calidad de vida en 2 grupos de estudio con los cuestionarios SF-8 (Short-Form Health Survey - 8), SF-12 (Short-Form Health Survey - 12), SF-36 (Short-Form Health Survey - 36) y WHOQOL-BREF (The World Health Organization Quality of Life-BREF), con las dimensiones física y psicológica. Así mismo, un riguroso análisis del riesgo de sesgo fue realizado, cuyos resultados pueden observarse en la siguiente figura:

Fulfilling the search requirements, 7 articles were selected. The articles measured quality of life in 2 study groups with the SF-8 (Short-Form Health Survey - 8), SF-12 (Short-Form Health Survey - 12), SF-36 (Short-Form Health Survey - 36) and WHOQOLBREF (The World Health Organization Quality of Life-BREF) questionnaires with mental and physical dimensions. Likewise, a rigorous bias risk analysis was performed, the results of which can be seen in the following figure:



Tras la realización del riesgo de sesgo, se procedió al análisis de la calidad de la evidencia (GRADE), cuyo resultado fue:

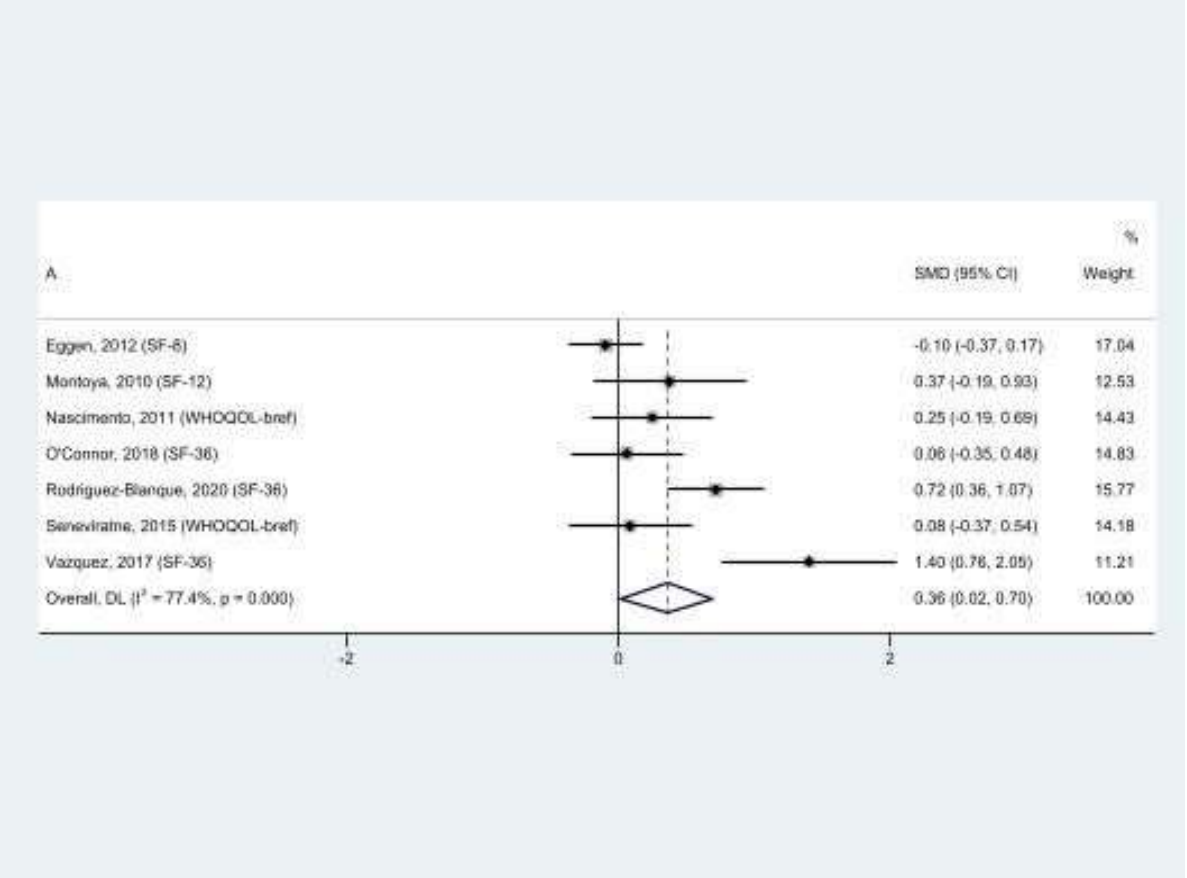
After risk of bias assessment, the quality of evidence analysis (GRADE) was made, and the result was:

Por último, 7 estudios fueron incluidos en el meta-análisis. Los resultados de la dimensión mental revelaron una asociación positiva entre el grupo de intervención durante el embarazo y la calidad de vida (ES = 0.358, 95% CI = 0.021, 0.695, I^2 = 77.4%, $P_{heterogeneidad}$ = 0.037). Este análisis se muestra en la siguiente figura:

Finnaly, 7 studies were included in the meta-analysis. Results of mental dimension revealed a possitive association between intervention group during pregnancy and quality of life (ES = 0.358, 95% CI = 0.021, 0.695, I^2 = 77.4%, $P_{heterogeneity}$ = 0.037). This analysis is shown in the next figure:

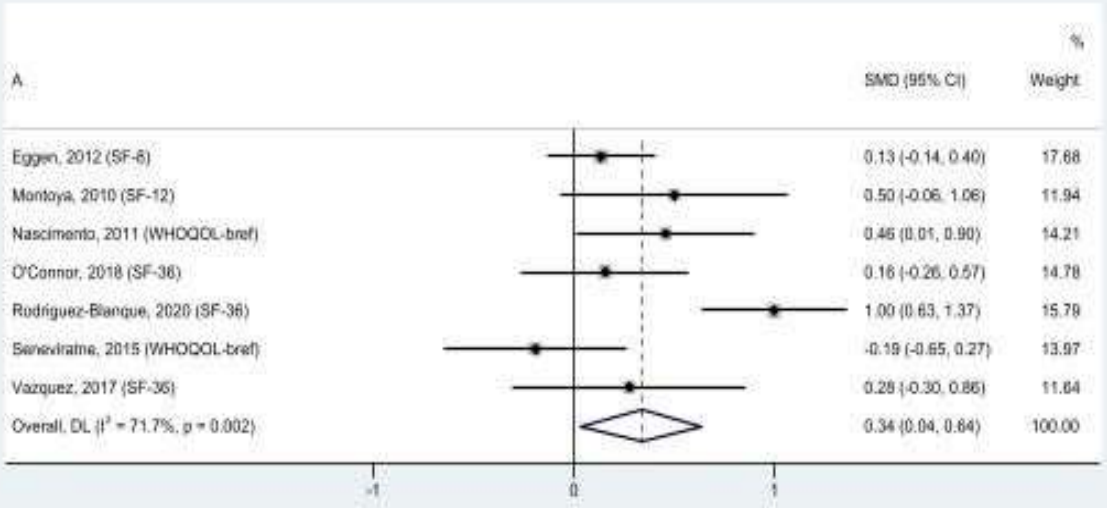

Calidad de vida

7	ensayos aleatorios	no es serio	no es serio	no es serio	no es serio	fuerte asociación	678	678	-	SMD 2.106 SD más alto. (1 más alto a 3.344 más alto.)	⨁⨁⨁⨁ Alta	CRITICO



Así mismo, 7 estudios fueron incluidos en el análisis de la dimensión física. Los resultados revelaron una asociación positiva entre el grupo de intervención durante el embarazo y la calidad de vida (ES = 0.335, 95% CI = 0.035, 0.635, I^2 = 71.7%,
$P_{heterogeneidad}$ = 0.029). Este análisis se muestra en la siguiente figura:

Likewise, 7 studies were included in the physical dimension analysis. Results of mental dimension revealed a possitive association between intervention group during pregnancy and quality of life (ES = 0.335, 95% CI = 0.035, 0.635, I^2 = 71.7%, $P_{heterogeneity}$ = 0.029). This analysis is shown in the next figure:


A
SMD (95% CI)
%
Weight
Eggen, 2012 (SF-6)
0.13 (-0.14, 0.40)
17.68
Montoya, 2010 (SF-12)
0.50 (-0.06, 1.06)
11.94
Nascimento, 2011 (WHOQOL-bref)
0.46 (0.01, 0.90)
14.21
O'Connor, 2018 (SF-36)
0.16 (-0.26, 0.57)
14.78
Rodríguez-Blanque, 2020 (SF-36)
1.00 (0.63, 1.37)
15.79
Senaviratne, 2015 (WHOQOL-bref)
-0.19 (-0.65, 0.27)
13.97
Vazquez, 2017 (SF-36)
0.28 (-0.30, 0.86)
11.64
Overall, DL (I^2 = 71.7%, p = 0.002)
0.34 (0.04, 0.64)
100.00
-1
0
1

Informe calidad de sueño / Sleep quality report

Para el registro de esta revisión sistemática, la estrategia PICO fue la siguiente:

To register this systematic review, PICO strategy was:

- Población / Population: Inclusión: gestantes sanas, mayores de 18 años, sin contraindicaciones para el ejercicio físico, independientemente de su edad gestacional al ingreso al estudio. Las contraindicaciones absolutas incluyen: o Rotura de membranas, parto prematuro. o Sangrado persistente en el segundo o tercer trimestre/placenta previa. o Hipertensión inducida por el embarazo o preeclampsia. o Cuello uterino incompetente. o Restricción del crecimiento intrauterino. o Embarazo de alto orden.
  - o Diabetes tipo 1 no controlada, hipertensión o enfermedad tiroidea, otros trastornos cardiovasculares, respiratorios o sistémicos graves

Inclusion: healthy pregnant women, aged above 18 years old, with no contraindications for physical exercise, regardless of their gestational age at the time of study entry. Absolute contraindications include:

- o Ruptured membranes, premature labour. o Persistent second or third trimester bleeding/placenta previa. o Pregnancy-induced hypertension or pre-eclampsia. o Incompetent cervix.
- o Intrauterine growth restriction. o High-order pregnancy.
- o Uncontrolled Type 1 diabetes, hypertension or thyroid disease, other serious cardiovascular, respiratory or systemic disorder

- Intervención / Intervention: La intervención objetivo estará relacionada con los diferentes modelos que incluyen cualquier formato de actividad física durante el embarazo (individual/grupal), (autónomo/supervisado), (presencial/online) (ejercicio agudo y crónico) y co-intervenciones (por ejemplo, nutrición). Se registrará la Intensidad, duración, frecuencia, tipo de ejercicio, trimestre de duración del embarazo y adherencia al programa. / The target intervention will be related to the different models that include any format of physical activity during pregnancy (individual/group), (autonomous/supervised), (face-toface/online) (acute and chronic exercise) and co-interventions (e.g., nutrition). It will be recorded the Intensity, duration, frequency, type of exercise, trimester of pregnancy duration and t
- Variables / Outcomes: El resultado primario será la evaluación de la calidad del sueño durante el embarazo. / The primary outcome will be the assessment of sleep quality during pregnancy.

Se realizó una exhaustiva búsqueda para analizar los efectos de intervenciones incluyendo algún tipo de actividad física en la calidad del sueño (medida a través de cuestionarios validados) en comparación con un grupo que no realizó esta intervención, en las siguientes bases de datos:

A comprehensive search was performed to analyze the effects of interventions including any physical activity type on sleep quality (measured through validated questionnaires) in comparison with a group that didn't realize this intervention, on the following databases:

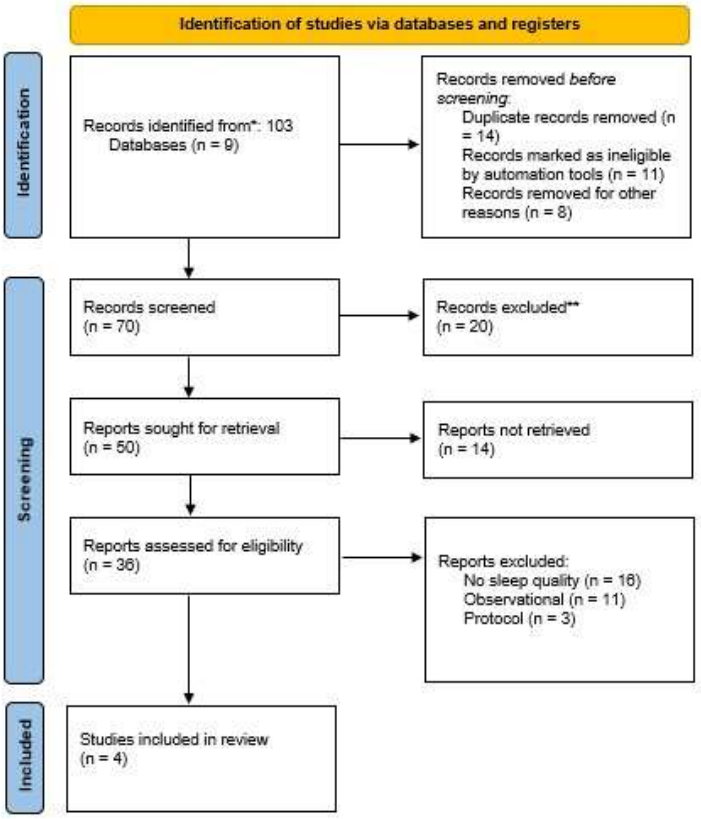
- EBSCO o Academic Search Premier. o ERIC. o MEDLINE. o SPORTDiscus.

o OpenDissertations. - Clinicaltrials.gov - Web of Science.

- Scopus.
- Cochrane Database of Systematic Reviews.

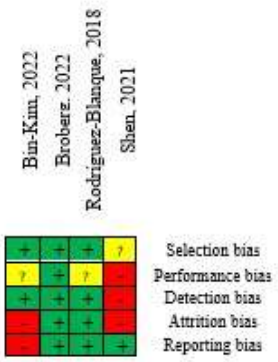
Los resultados de la búsqueda se observan en el siguiente Flowchart:

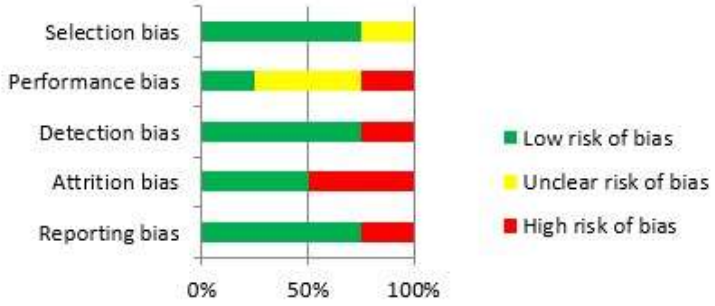
The search results are displayed in the next Flowchart:



Cumpliendo con los requerimientos de la búsqueda, 4 artículos fueron seleccionados.
Los artículos midieron la calidad de sueño en 2 grupos de estudio con el cuestionario PSQI (Pittsburgh Sleep Quality Index). Así mismo, un riguroso análisis del riesgo de sesgo fue realizado, cuyos resultados pueden observarse en la siguiente figura:

Fulfilling the search requirements, 4 articles were selected. The articles measured sleep quality in 2 study groups with the PSQI (Pittsburgh Sleep Quality Index) questionnaire. Likewise, a rigorous bias risk analysis was performed, the results of which can be seen in the following figure:





Tras la realización del riesgo de sesgo, se procedió al análisis de la calidad de la evidencia (GRADE), cuyo resultado fue:

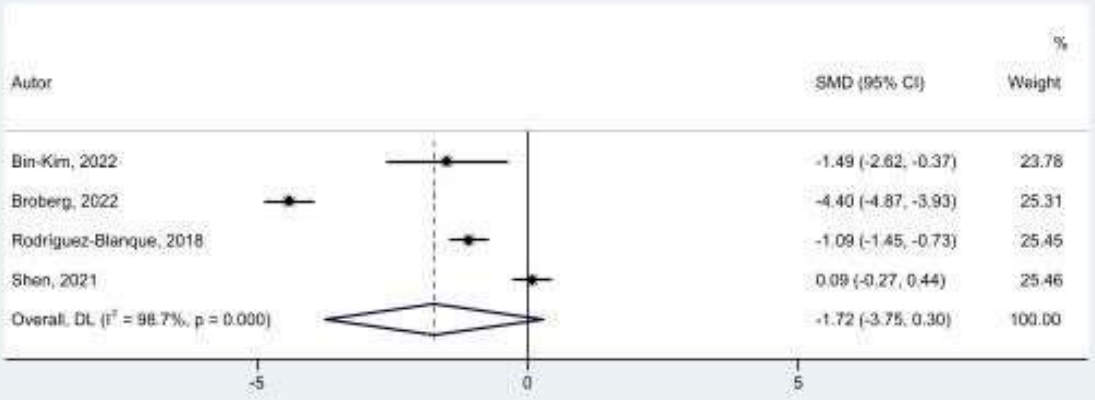
After risk of bias assessment, the quality of evidence analysis (GRADE) was made, and the result was:

Por último, 4 estudios fueron incluidos en el meta-análisis. Los resultados revelaron una asociación negativa entre el grupo de intervención durante el embarazo y la calidad de sueño (ES = -0.620, 95% CI = -1.188, -0.052, I^2 = 87.4%, $P_{heterogeneidad}$ = 0.033). Este análisis se muestra en la siguiente figura:

Finally, 4 studies were included in the meta-analysis. Results revealed a negative association between intervention group during pregnancy and sleep quality (ES = -
0.620, 95% CI = -1.188, -0.052, I^2 = 87.4%,, $P_{heterogeneity}$ = 0.033). This analysis is shown in the next figure:


Calidad de sueño / Sleep quality (evaluado con : Cuestionarios / Questionnaires)

4	ensayos aleatorios	serio	no es serio	no es serio	no es serio	fuerte asociacion	515	515	-	SMD 2.822 SD más alto. (1 más alto a 5.273 más alto)	Alta	CRITICO


Autor
SMD (95% CI)
%
Weight
Bin-Kim, 2022
-1.49 (-2.62, -0.37)
23.78
Broberg, 2022
-4.40 (-4.87, -3.93)
25.31
Rodriguez-Blanque, 2018
-1.09 (-1.45, -0.73)
25.45
Shen, 2021
0.09 (-0.27, 0.44)
25.46
Overall, DL (I^2 = 98.7%, p = 0.000)
-1.72 (-3.75, 0.30)
100.00
-5
0
5

Informe dolor de espalda / Low-back pain report

Para el registro de esta revisión sistemática, la estrategia PICO fue la siguiente:

To register this systematic review, PICO strategy was:

- Población / Population: Inclusión: gestantes sanas, mayores de 18 años, sin contraindicaciones para el ejercicio físico, independientemente de su edad gestacional al ingreso al estudio. Las contraindicaciones absolutas incluyen: o Rotura de membranas, parto prematuro. o Sangrado persistente en el segundo o tercer trimestre/placenta previa. o Hipertensión inducida por el embarazo o preeclampsia. o Cuello uterino incompetente. o Restricción del crecimiento intrauterino. o Embarazo de alto orden.
  - o Diabetes tipo 1 no controlada, hipertensión o enfermedad tiroidea, otros trastornos cardiovasculares, respiratorios o sistémicos graves

Inclusion: healthy pregnant women, aged above 18 years old, with no contraindications for physical exercise, regardless of their gestational age at the time of study entry. Absolute contraindications include:

- o Ruptured membranes, premature labour. o Persistent second or third trimester bleeding/placenta previa. o Pregnancy-induced hypertension or pre-eclampsia. o Incompetent cervix.
- o Intrauterine growth restriction. o High-order pregnancy.
- o Uncontrolled Type 1 diabetes, hypertension or thyroid disease, other serious cardiovascular, respiratory or systemic disorder
- Intervención / Intervention: La intervención objetivo estará relacionada con los diferentes modelos que incluyen cualquier formato de actividad física durante el embarazo (individual/grupal), (autónomo/supervisado), (presencial/online) (ejercicio agudo y crónico) y co-intervenciones (por ejemplo, nutrición). Se registrará la Intensidad, duración, frecuencia, tipo de ejercicio, trimestre de duración del embarazo y adherencia al programa. / The target intervention will be related to the different models that include any format of physical activity during pregnancy (individual/group), (autonomous/supervised), (face-toface/online) (acute and chronic exercise) and co-interventions (e.g., nutrition). It will be recorded the Intensity, duration, frequency, type of exercise, trimester of pregnancy duration and adherence to the program
- Comparación / Comparison: La comparación se basará en la no práctica de actividad física considerando el grupo de no intervención de los estudios seleccionados. Además, incluiremos otras revisiones sistemáticas para comparar otros resultados de estas variables con los nuestros. / The comparison will be based on not practicing physical activity considering the non-intervention group of the selected studies. Also, we will include other systematic reviews to compare other outcomes of these variables with ours.
- Variables / Outcomes: El resultado primario será la incidencia de dolor de espalda durante el embarazo. / The primary outcome will be the incidence of low-back pain during pregnancy.

Se realizó una exhaustiva búsqueda para analizar los efectos de intervenciones incluyendo algún tipo de actividad física en la incidencia de dolor de espalda (medida a través de cuestionarios

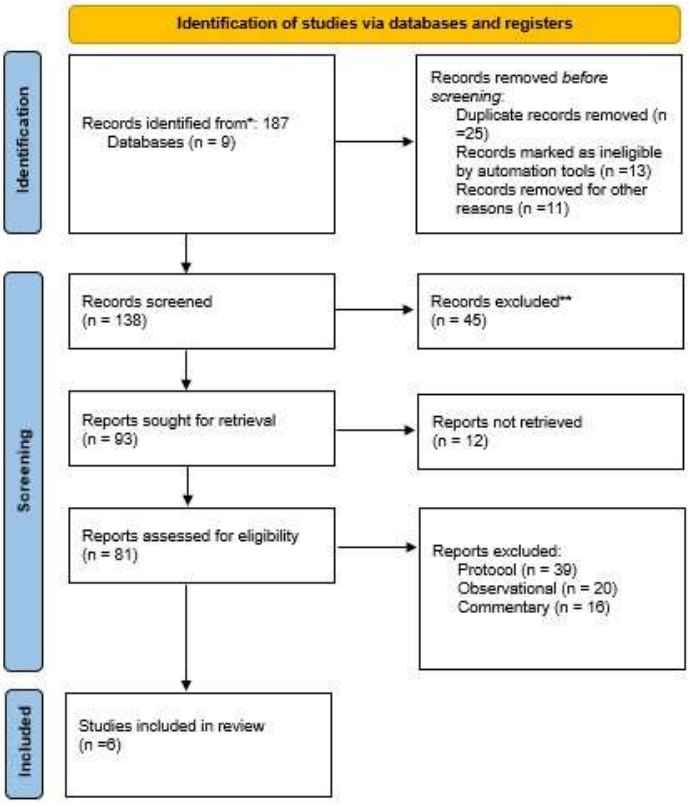
validados) en comparación con un grupo que no realizó esta intervención, en las siguientes bases de datos:

A comprehensive search was performed to analyze the effects of interventions including any physical activity type on low-back pain incidence (measured through validated questionnaires) in comparison with a group that didn't realize this intervention, on the following databases:

- EBSCO o Academic Search Premier. o ERIC. o MEDLINE. o SPORTDiscus. o OpenDissertations. - Clinicaltrials.gov - Web of Science.
- Scopus.
- Cochrane Database of Systematic Reviews.

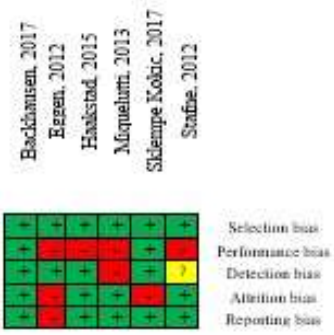
Los resultados de la búsqueda se observan en el siguiente Flowchart:

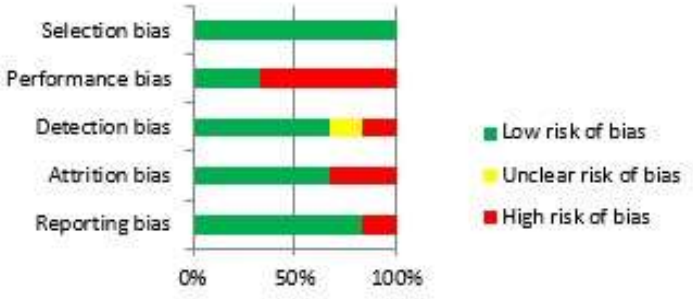
The search results are displayed in the next Flowchart:



Cumpliendo con los requerimientos de la búsqueda, 6 artículos fueron seleccionados. Los artículos midieron la incidencia de dolor de espalda en 2 grupos de estudio. Así mismo, un riguroso análisis del riesgo de sesgo fue realizado, cuyos resultados pueden observarse en la siguiente figura:

Fulfilling the search requirements, 6 articles were selected. The articles measured lowback pain incidence in 2 study groups. Likewise, a rigorous bias risk analysis was performed, the results of which can be seen in the following figure:



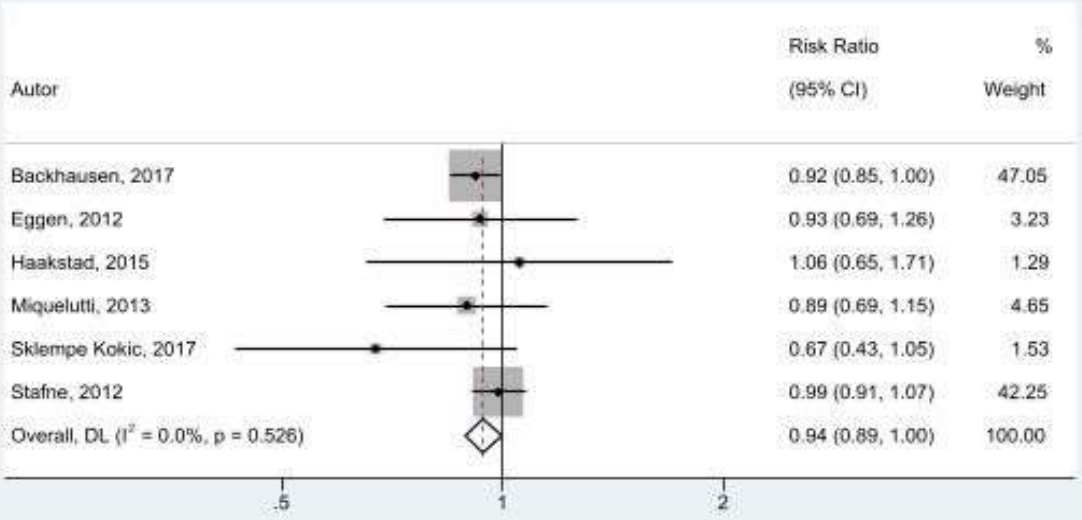


Tras la realización del riesgo de sesgo, se procedió al análisis de la calidad de la evidencia (GRADE), cuyo resultado fue:

After risk of bias assessment, the quality of evidence analysis (GRADE) was made, and the result was:

Por último, 6 estudios fueron incluidos en el meta-análisis. Los resultados revelaron una asociación negativa entre el grupo de intervención durante el embarazo y la incidencia de dolor de espalda (RR = 0.944, 95% CI = 0.893, 0.997, I^2 = 0%, $P_{heterogeneidad}$ = 0.037). Este análisis se muestra en la siguiente figura:

Finnaly, 4 studies were included in the meta-analysis. Results revealed a negative association between intervention group during pregnancy and low-back pain incidence
(RR = 0.944, 95% CI = 0.893, 0.997, I^2 = 0%, $P_{heterogeneity}$ = 0.037). This analysis is shown in the next figure:

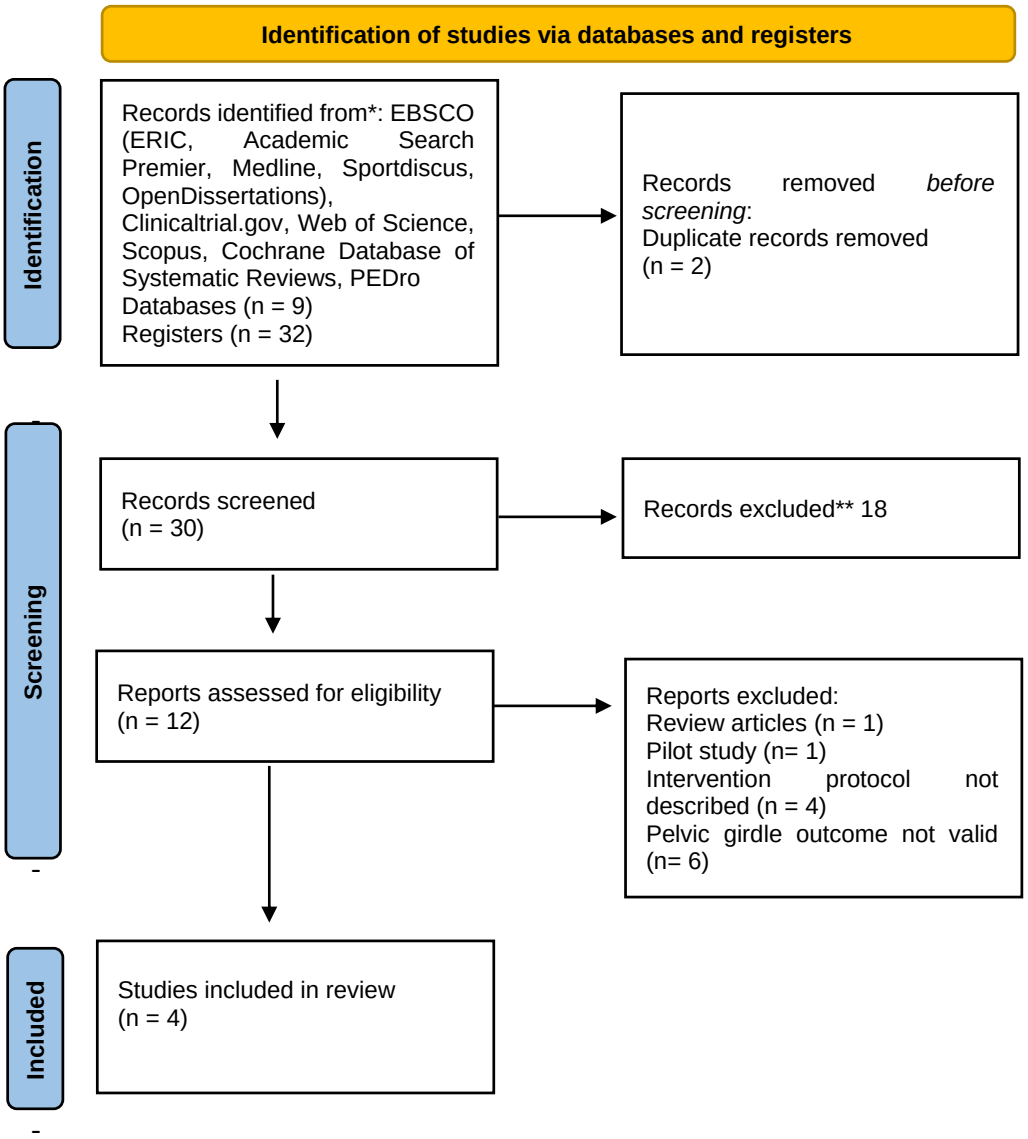

Autor
Risk Ratio
(95% CI)
%
Weight
Backhausen, 2017
0.92 (0.85, 1.00)
47.05
Eggen, 2012
0.93 (0.69, 1.26)
3.23
Haakstad, 2015
1.06 (0.65, 1.71)
1.29
Miquelutti, 2013
0.89 (0.69, 1.15)
4.65
Sklempe Kokic, 2017
0.67 (0.43, 1.05)
1.53
Stafne, 2012
0.99 (0.91, 1.07)
42.25
Overall, DL (I^2 = 0.0%, p = 0.526)
0.94 (0.89, 1.00)
100.00
.5
1
2

Resultados meta-análisis

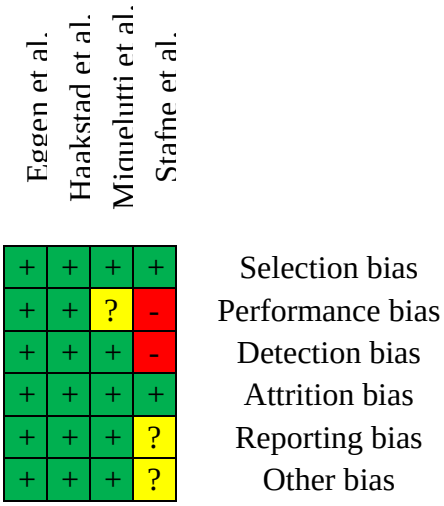
Pelvic Girdle

We assessed the effect of exercise interventions on the incidence of pelvic girdle pain

- **Flowchart**

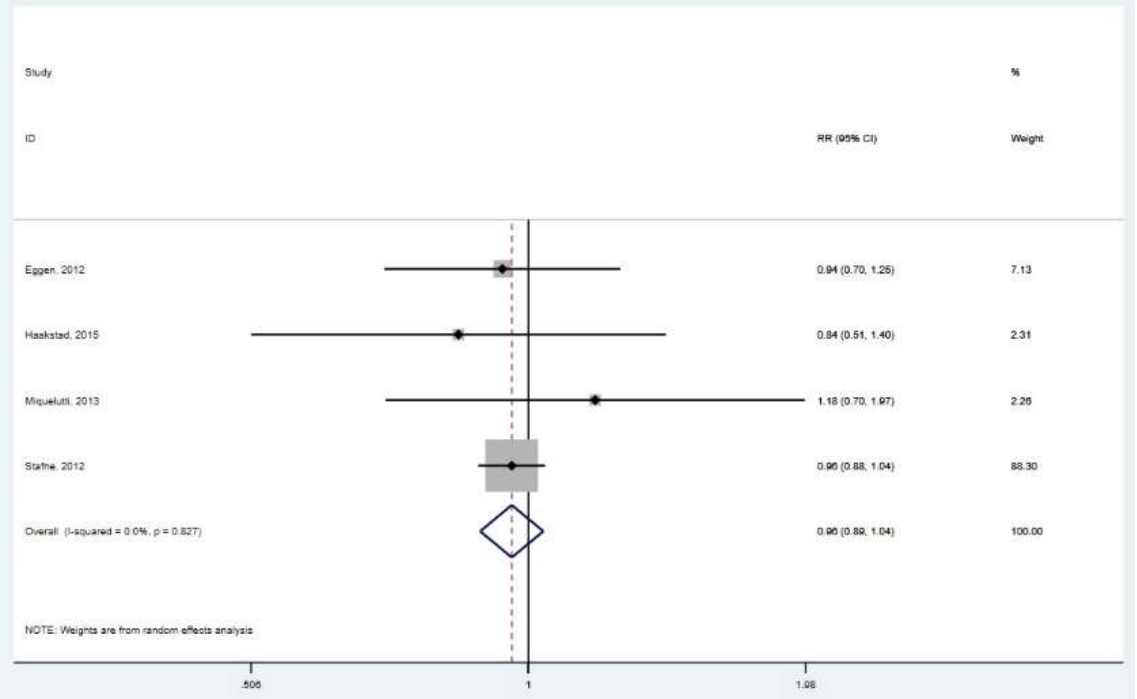


Risk of bias



- **Metaanalisis**

Four studies were included in this analysis. The results revealed a positive association with intervention group (RR = 0.069, 95% CI = -.888, 1.037, I2 = 0.0%, $P_{heterogeneity}$ = 0.827).

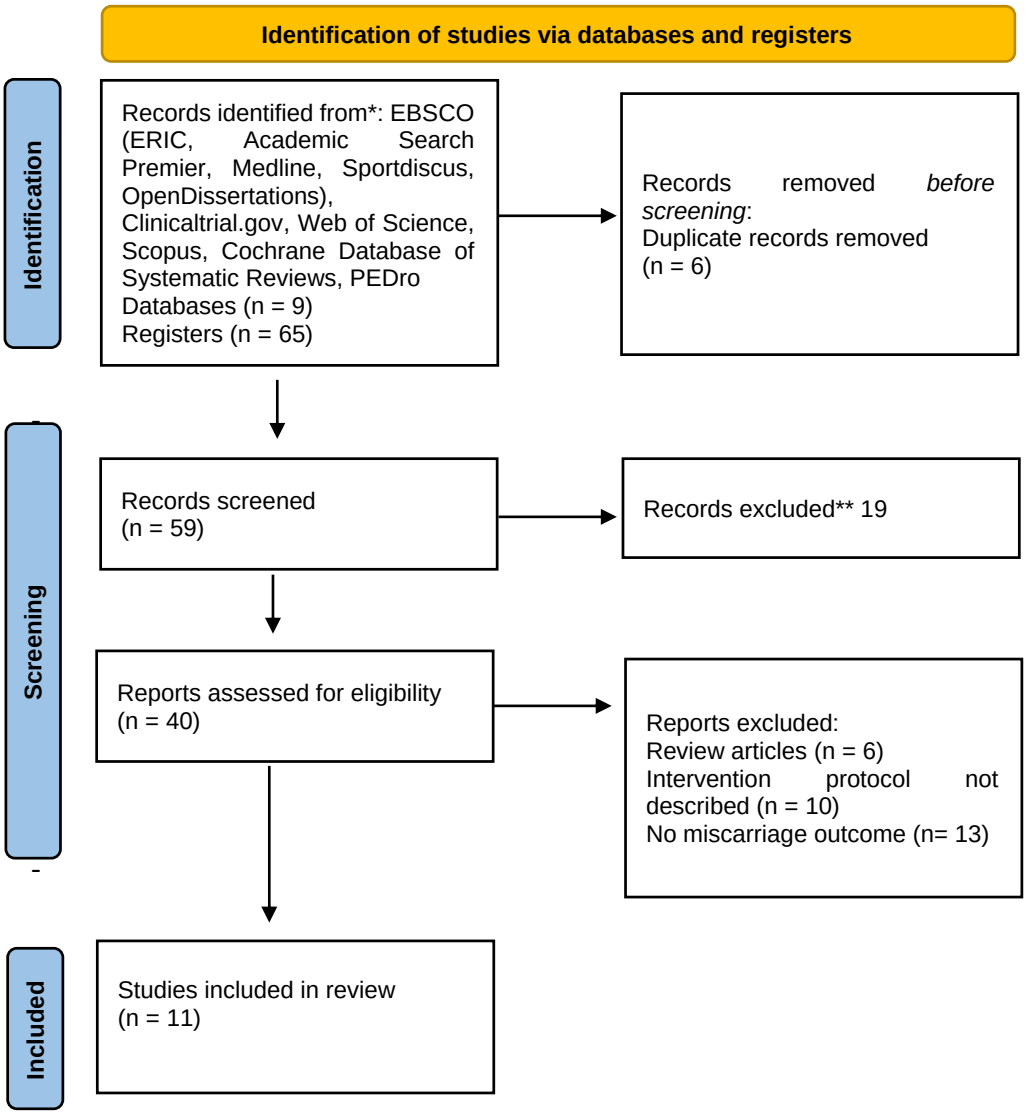


- **Grade**

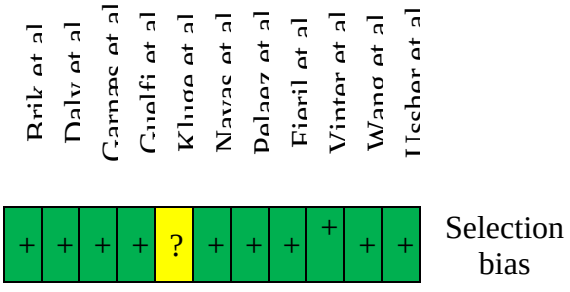
Aborto/Miscarriage

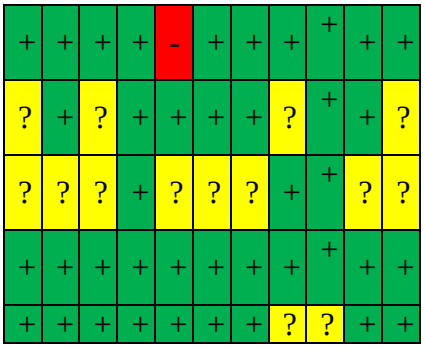
We investigated the effect of exercise interventions on the number of miscarriages

- **Flowchart**



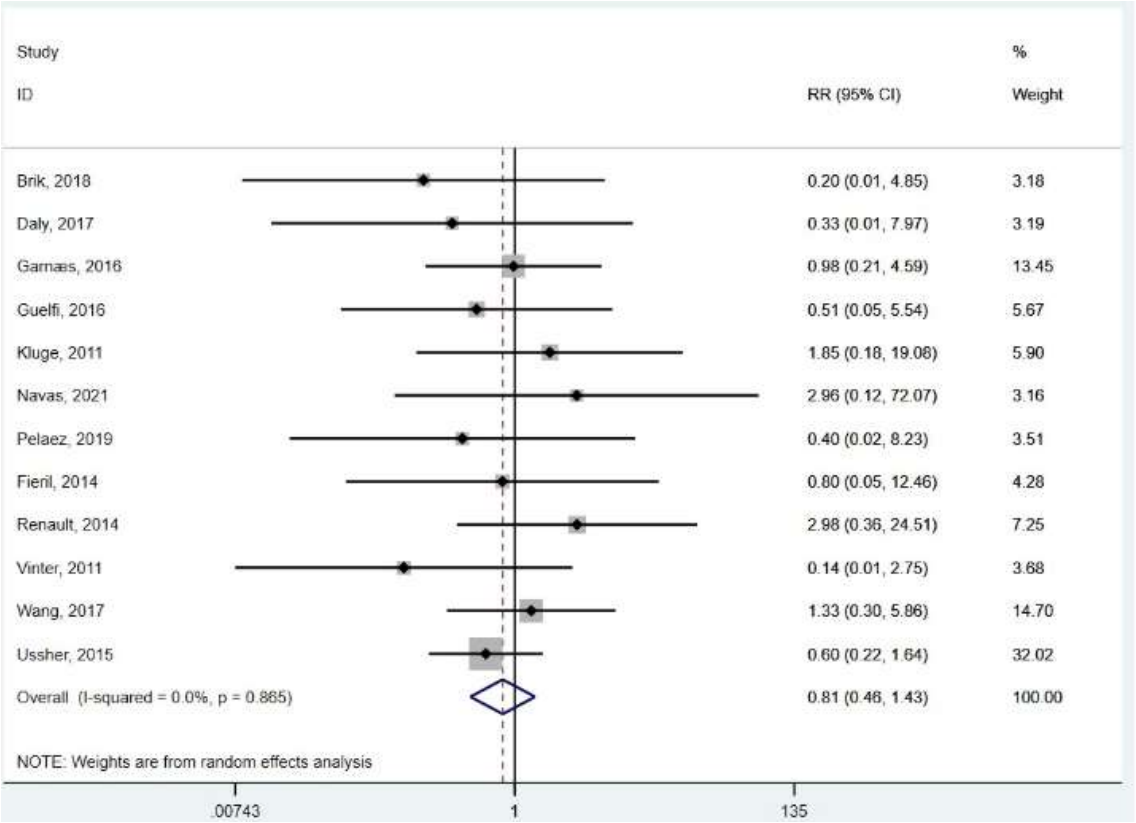
Risk of bias





- **Metaanalisis**

A total of ten studies were included in this analysis. Slightly fewer number of miscarriages took place in the intervention group compared to control (RR=0.810, 95% CI = 0.459, 1.428, I2 = 0.0%, Pheterogeneity = 0.865).



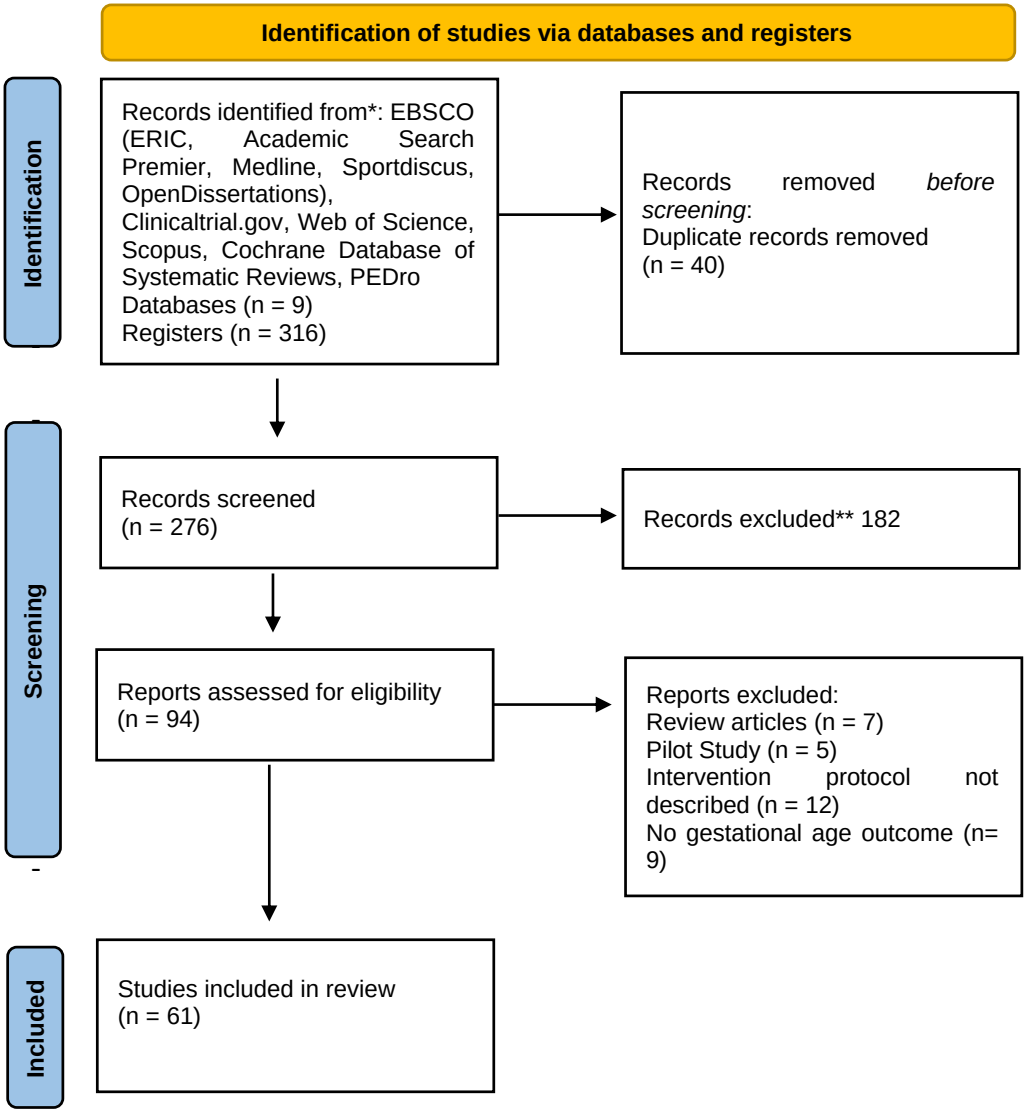
-

- **Grade**

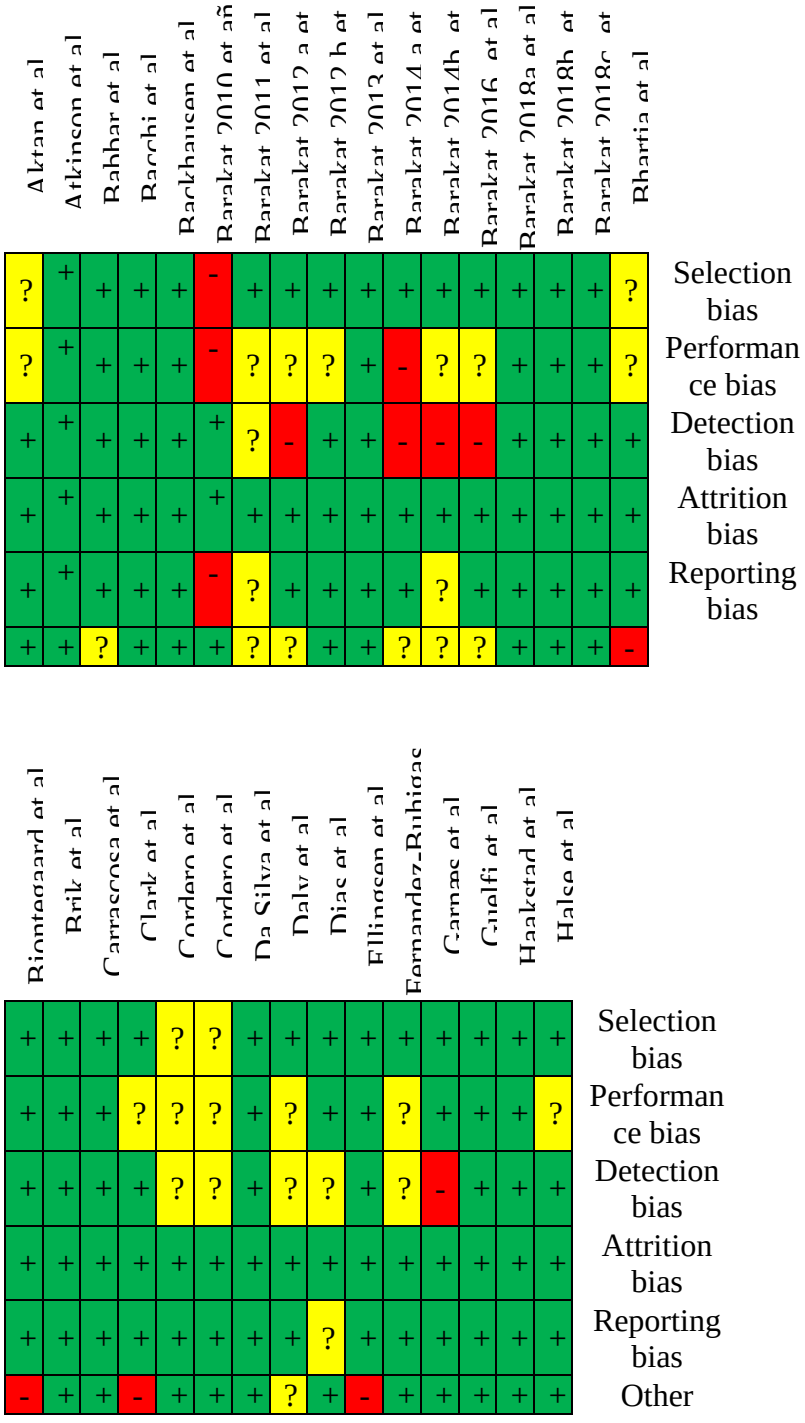
Gestational age

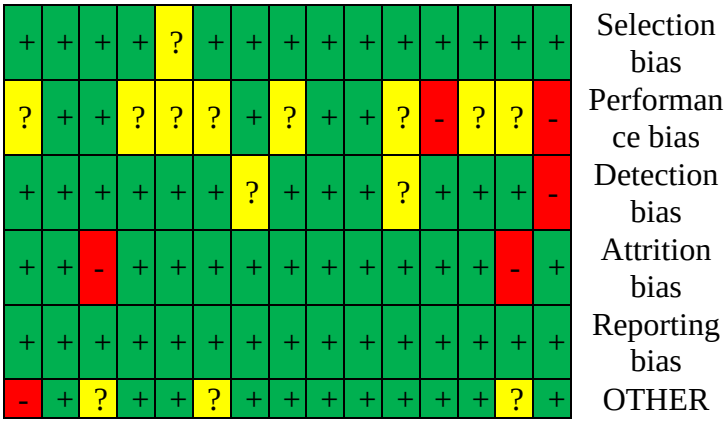
We assessed the effect of exercise interventions on gestational age at delivery

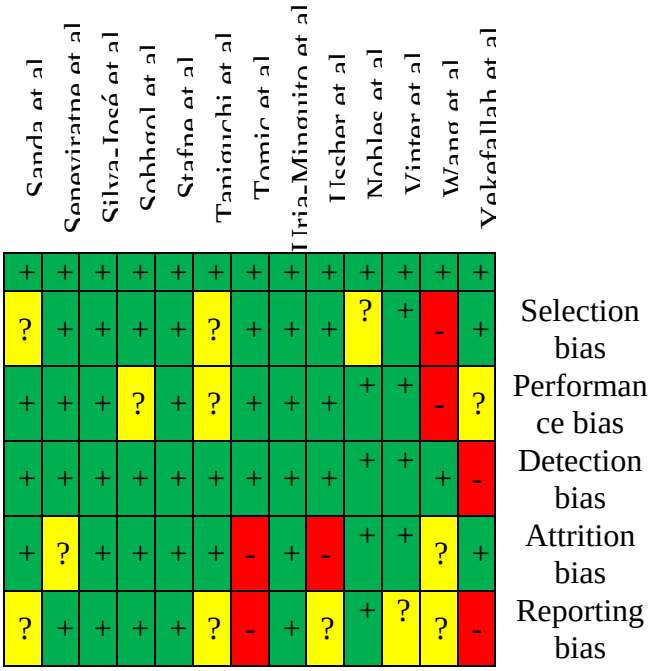
- **Flowchart**



- **Risk of bias**

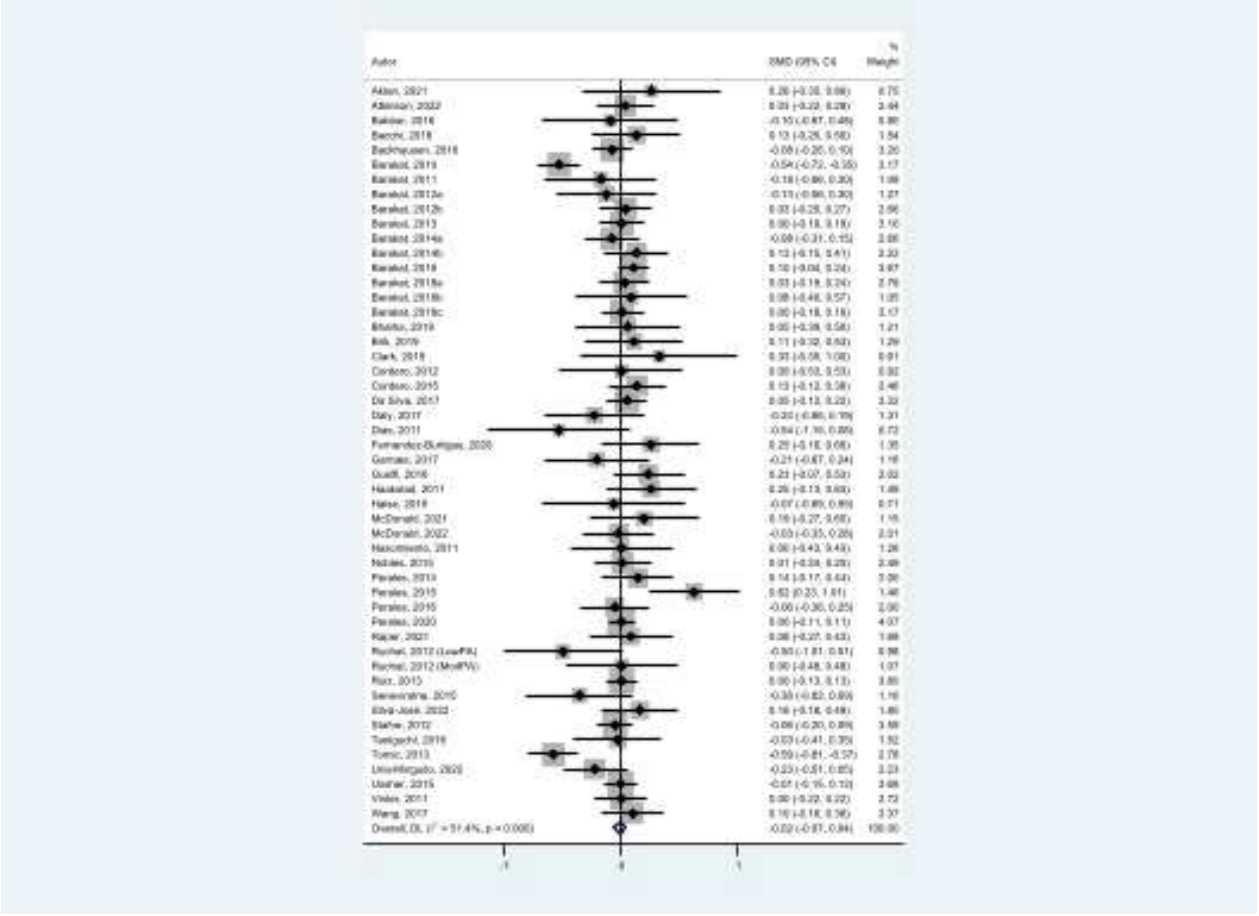

Akan et al
Atkinson et al
Babar et al
Bacchi et al
Barkhausen et al
Barakat 2010 et al
Barakat 2011 et al
Barakat 2012 a et
Barakat 2012 b et
Barakat 2013 et al
Barakat 2014 a et
Barakat 2014b et
Barakat 2016 et al
Barakat 2018a et al
Barakat 2018b et
Barakat 2018c et
Bhatia et al
Selection bias
Performance bias
Detection bias
Attrition bias
Reporting bias
Bjontegaard et al
Brik et al
Carrascosa et al
Clark et al
Cordero et al
Cordero et al
Da Silva et al
Daly et al
Dias et al
Ellington et al
Fernandez-Rubigas
Garnaes et al
Gualfi et al
Haakstad et al
Halse et al
Selection bias
Performance bias
Detection bias
Attrition bias
Reporting bias
Other
Hallanes et al
Lean et al
Murtezani et al
McDonald et al
McDonald et al
McMillan et al
Nascimiento et al
Nobles et al
Pais et al
Paralac et al
Paralac et al
Paralac et al
Rager et al
Ruchat et al
Ruiz et al


Selection bias
Performance bias
Detection bias
Attrition bias
Reporting bias
OTHER


Sanda et al
Senaviratna et al
Silva-José et al
Sohbgol et al
Stafne et al
Taniguchi et al
Tomic et al
Tria-Mingnito et al
Tscher et al
Noble et al
Vinter et al
Wang et al
Yakefallah et al
Selection bias
Performance bias
Detection bias
Attrition bias
Reporting bias

- **Metaanalisis**

Fifty-six studies were included in this analysis, comparing gestational intervention and control groups. Results revealed a small negative association between exercise practice during pregnancy and gestational age at the end of pregnancy (ES= -0.016, z = −0.563, *p*= 0.574; 95% CI = −0.073, −0.040, I2 = 51.4%, Pheterogeneity = 0.0175).



- **Grade**

Gestational age

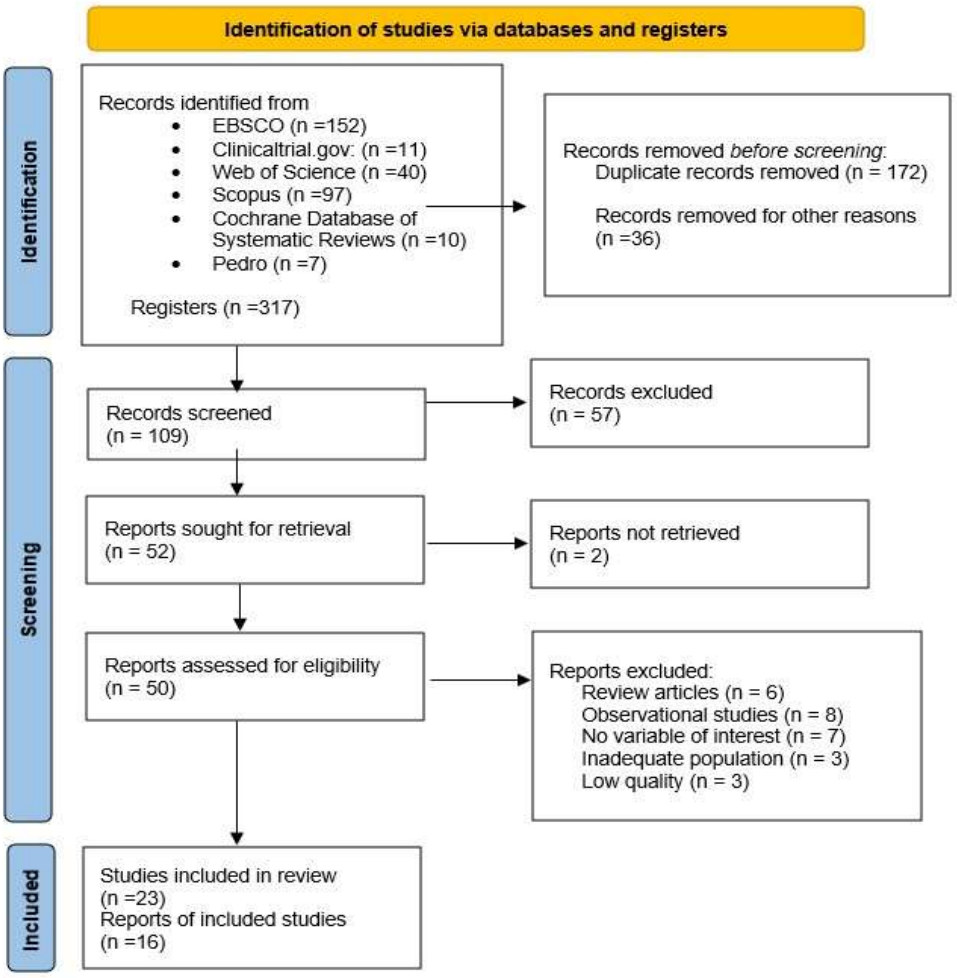
49	ensayos aleatorios	no es serio	no es serio	no es serio	no es serio	asociación muy fuerte	12498	12498	-	SMD **1.434 SD más alto.** (1.113 más alto a 1.755 más alto)	⨁⨁⨁⨁ Alta	CRÍTICO

REPORT:

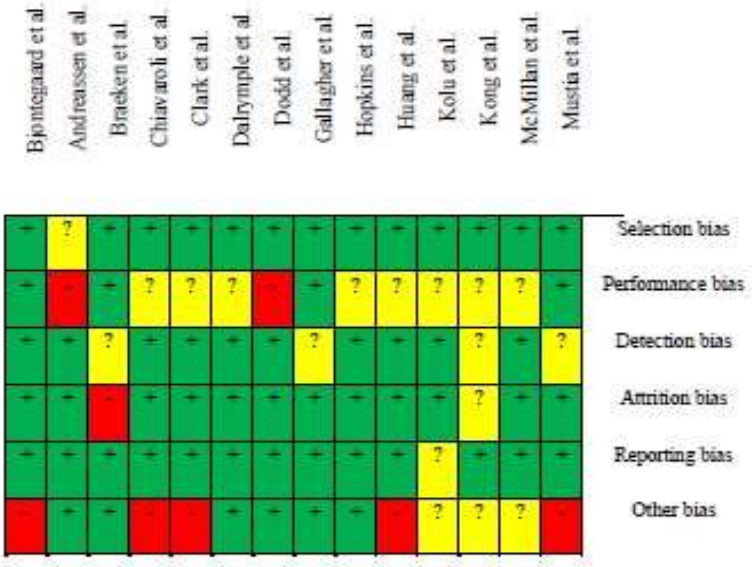
Table 1. PICOS Strategy

PICOS	DEFINITIONS
Population	pregnant women
Intervention	Interventions that include physical activity: • Individual/group • Autonomous/supervised • Face-to-face/online • Co-intervention (ex.: nutrition)
Comparison	Data based on non-practice of physical activity. • Intervention – non-intervention
Outcome	The main study variable
Study design	Randomized clinical trials

FLOW CHART:



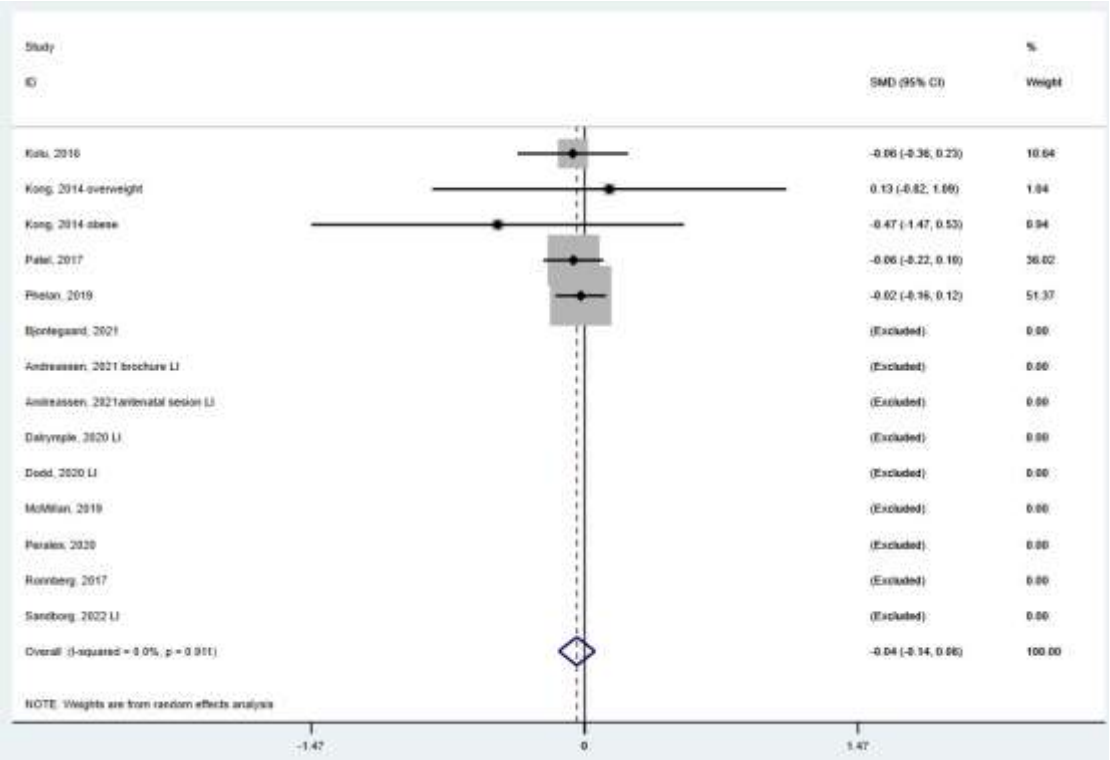
RISK OF BIAS:


Bjordegaard et al.
Andreassen et al.
Braeken et al.
Chiavaroli et al.
Clark et al.
Dalrymple et al.
Dodd et al.
Gallagher et al.
Hopkins et al.
Huang et al.
Kolu et al.
Kong et al.
McMillan et al.
Mustia et al.
Selection bias
Performance bias
Detection bias
Attrition bias
Reporting bias
Other bias


Nobles et al.
Patel et al.
Perales et al.
Phelan et al.
Poston et al.
Rauh et al.
Ronnberg et al.
Sandborg et al.
Tarvig et al.
Tarvig et al.
Selection bias
Performance bias
Detection bias
Attrition bias
Reporting bias
Other bias

RESULTS:

Infant obesity Z-score

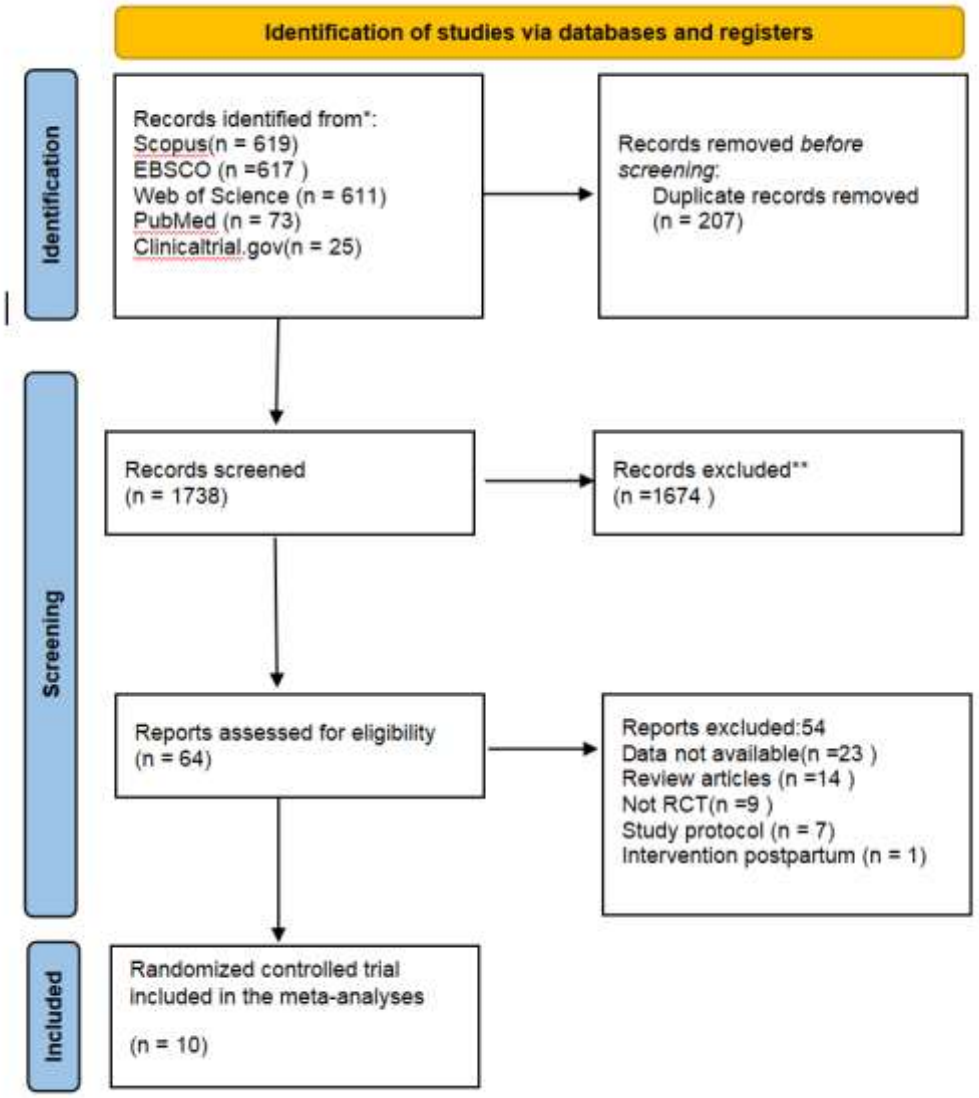


Study	SMD	[95% Conf.	Interval]	% Weight
Kolu, 2016	-0.064	-0.362	0.235	10.64
Kong, 2014 overweigh	0.133	-0.821	1.087	1.04
Kong, 2014 obese	-0.468	-1.471	0.535	0.94
Patel, 2017	-0.060	-0.222	0.102	36.02
Phelan, 2019	-0.020	-0.156	0.115	51.37
Bjontegaard, 2021	(Excluded)			
Andreassen, 2021 bro	(Excluded)			
Andreassen, 2021ante	(Excluded)			
Dalrymple, 2020 LI	(Excluded)			
Dodd, 2020 LI	(Excluded)			
McMillan, 2019	(Excluded)			
Perales, 2020	(Excluded)			
Ronnberg, 2017	(Excluded)			
Sandborg, 2022 LI	(Excluded)			
D+L pooled SMD	-0.042	-0.139	0.055	100.00

Heterogeneity chi-squared = 0.99 (d.f. = 4) p = 0.911
I-squared (variation in SMD attributable to heterogeneity) = 0.0%
Estimate of between-study variance Tau-squared = 0.0000

Test of SMD=0 : z= 0.85 p = 0.398

Incontinencia Urinaria/Urinary Incontinence



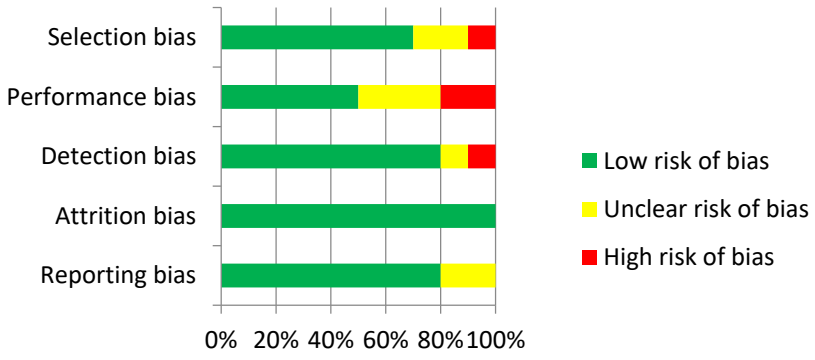
Participants
Inclusion: healthy pregnant women, aged above 18 years old, with no contraindications for physical exercise, regardless of their gestational age at the time of study entry. Absolute contraindications include: - Ruptured membranes, premature labor. - Persistent second or third-trimester bleeding/placenta previa. - Pregnancy-induced hypertension or pre-eclampsia. - Incompetent cervix. - Intrauterine growth restriction. - High-order pregnancy. - Uncontrolled Type 1 diabetes, hypertension or thyroid disease, other serious cardiovascular, respiratory or systemic disorder

Intervention(s)
The target intervention will be related to the different models that include any format of physical activity during pregnancy (individual/group), (autonomous/supervised), (face-to-face/online) (acute and chronic exercise) and cointerventions (ex.: nutrition). It will be recorded the Intensity, duration, frequency, type of exercise, trimester of pregnancy duration and adherence to the program.

Comparator(s)
The comparison will be based on not practicing physical activity considering the non-intervention group of the selected studies. Also, we will include other systematic reviews to compare other outcomes of these variables with ours.

Main outcome
Urinary incontinence

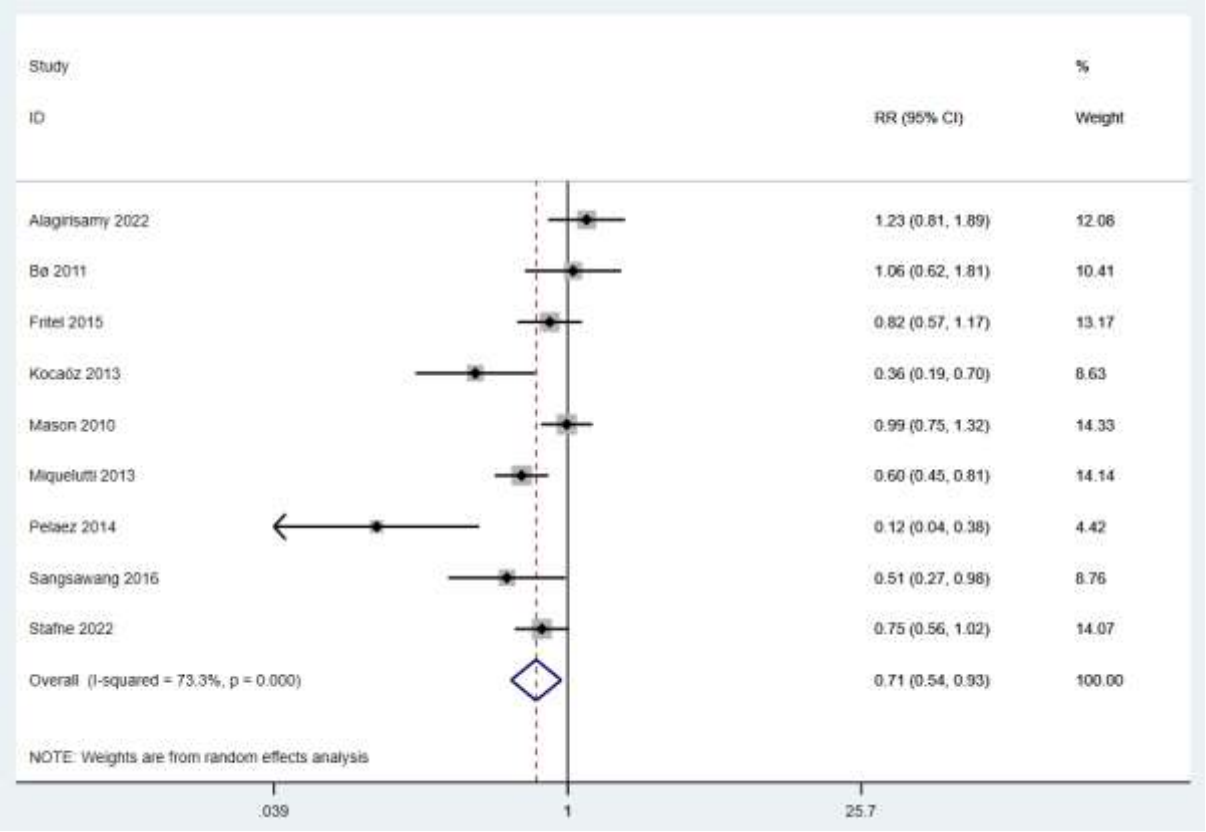
Alagirisamy, 2022	Bø, 2011	Fritel, 2015	Kocaöz, 2013	Mason, 2010	Miquelutti, 2013	Pelaez, 2014	Sangsawang, 2016	Stafne, 2022	Barakat, 2011	
+	+	+	-	+	+	?	+	?	+	Selection bias
?	+	+	+	+	-	-	+	?	?	Performance bias
+	+	+	?	+	-	+	+	+	+	Detection bias
+	+	+	+	+	+	+	+	+	+	Attrition bias
+	+	+	+	+	+	+	+	?	?	Reporting bias



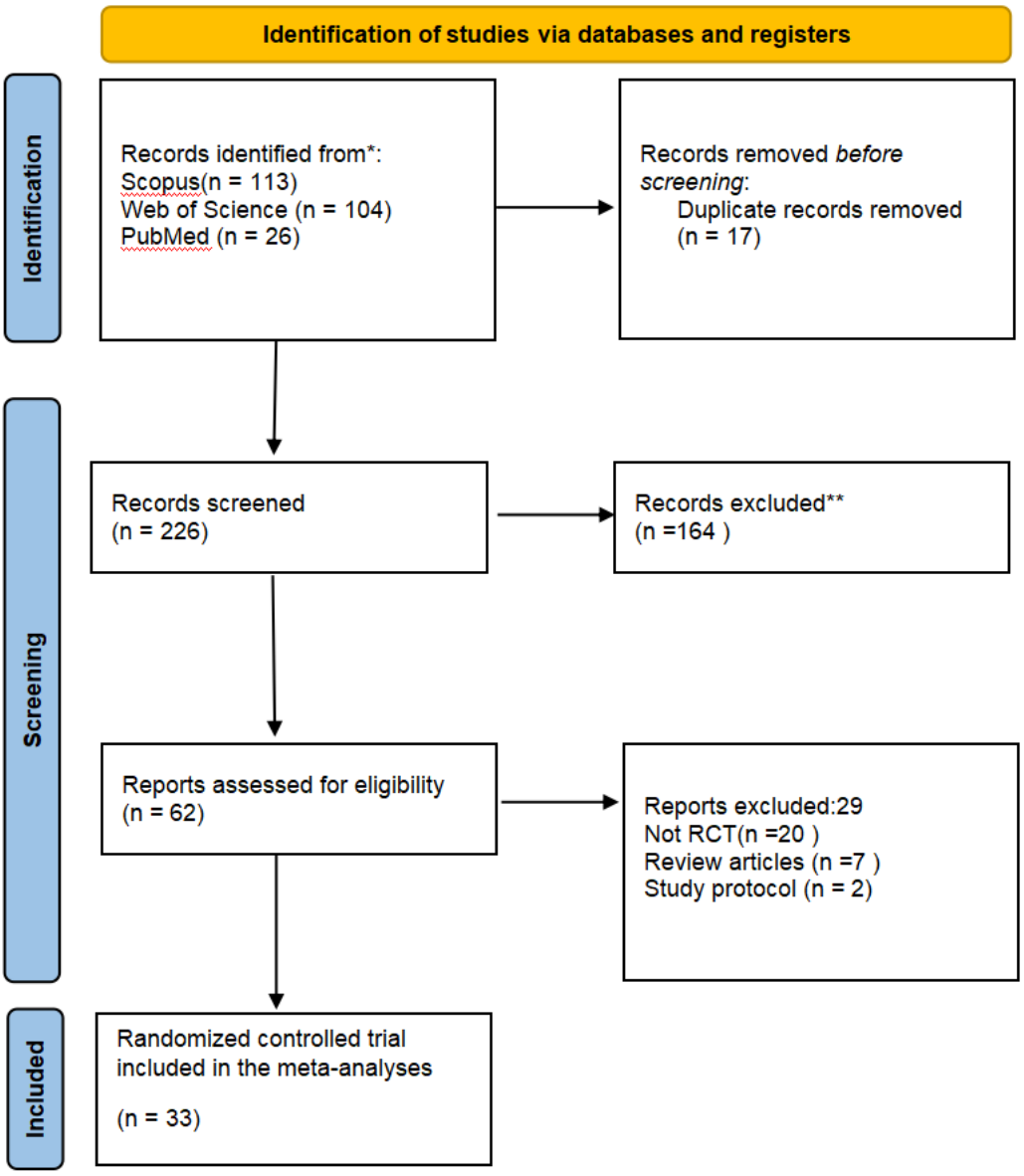
Study	RR	[95% Conf.	Interval]	% Weight
Alagirisamy 2022	**1.234**	**0.807**	**1.889**	**12.08**
Bø 2011	**1.063**	**0.624**	**1.809**	**10.41**
Fritel 2015	**0.821**	**0.574**	**1.174**	**13.17**
Kocaöz 2013	**0.361**	**0.186**	**0.698**	**8.63**
Mason 2010	**0.991**	**0.746**	**1.316**	**14.33**
Miquelutti 2013	**0.602**	**0.447**	**0.809**	**14.14**
Pelaez 2014	**0.121**	**0.039**	**0.376**	**4.42**
Sangsawang 2016	**0.511**	**0.267**	**0.980**	**8.76**
Stafne 2022	**0.753**	**0.557**	**1.017**	**14.07**
D+L pooled RR	**0.706**	**0.535**	**0.933**	**100.00**

Heterogeneity chi-squared = **29.94** (d.f. = **8**) p = **0.000**
I-squared (variation in RR attributable to heterogeneity) = **73.3%**
Estimate of between-study variance Tau-squared = **0.1190**

Test of RR=1 : z= **2.45** p = **0.014**



Tipo de parto/Type of delivery



Participants
Inclusion: healthy pregnant women, aged above 18 years old, with no contraindications for physical exercise, regardless of their gestational age at the time of study entry. Absolute contraindications include: - Ruptured membranes, premature labor. - Persistent second or third-trimester bleeding/placenta previa. - Pregnancy-induced hypertension or pre-eclampsia. - Incompetent cervix. - Intrauterine growth restriction. - High-order pregnancy. - Uncontrolled Type 1 diabetes, hypertension or thyroid disease, other serious cardiovascular, respiratory or systemic disorder

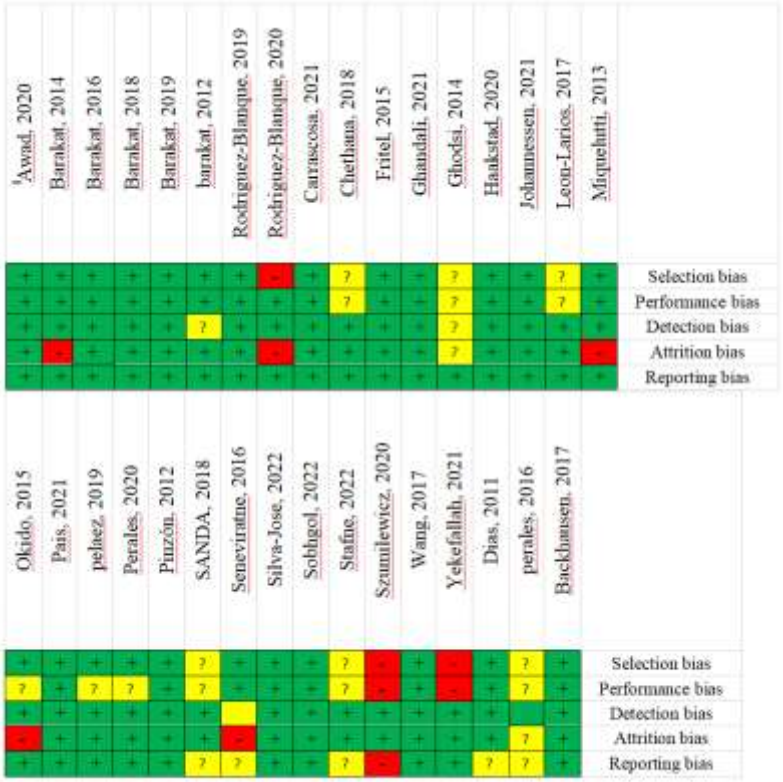
Intervention(s)
The target intervention will be related to the different models that include any format of physical activity during pregnancy (individual/group), (autonomous/supervised), (face-to-

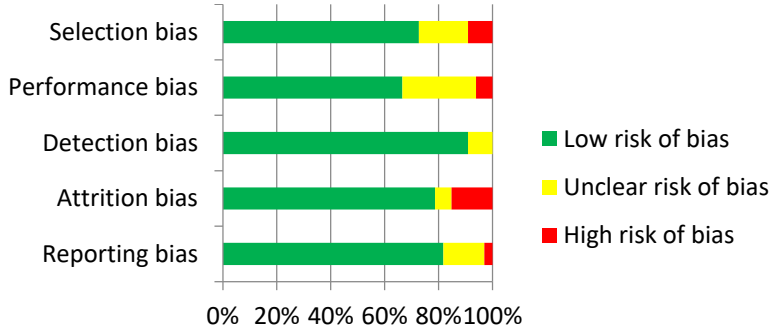
face/online) (acute and chronic exercise) and cointerventions (ex.: nutrition). It will be recorded the Intensity, duration, frequency, type of exercise, trimester of pregnancy duration and adherence to the program.

Comparator(s)
The comparison will be based on not practicing physical activity considering the non-intervention group of the selected studies. Also, we will include other systematic reviews to compare other outcomes of these variables with ours.

Main outcome
Type of delivery

Additional outcome(s)
Duration of labor



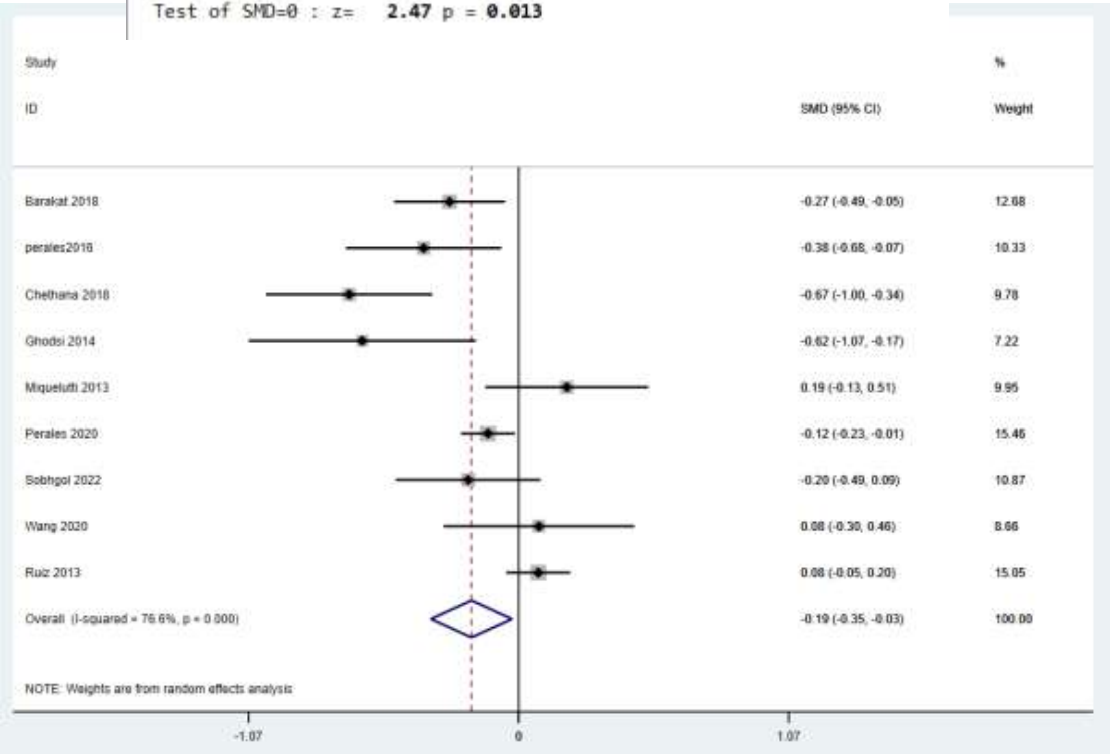


Duration of labor

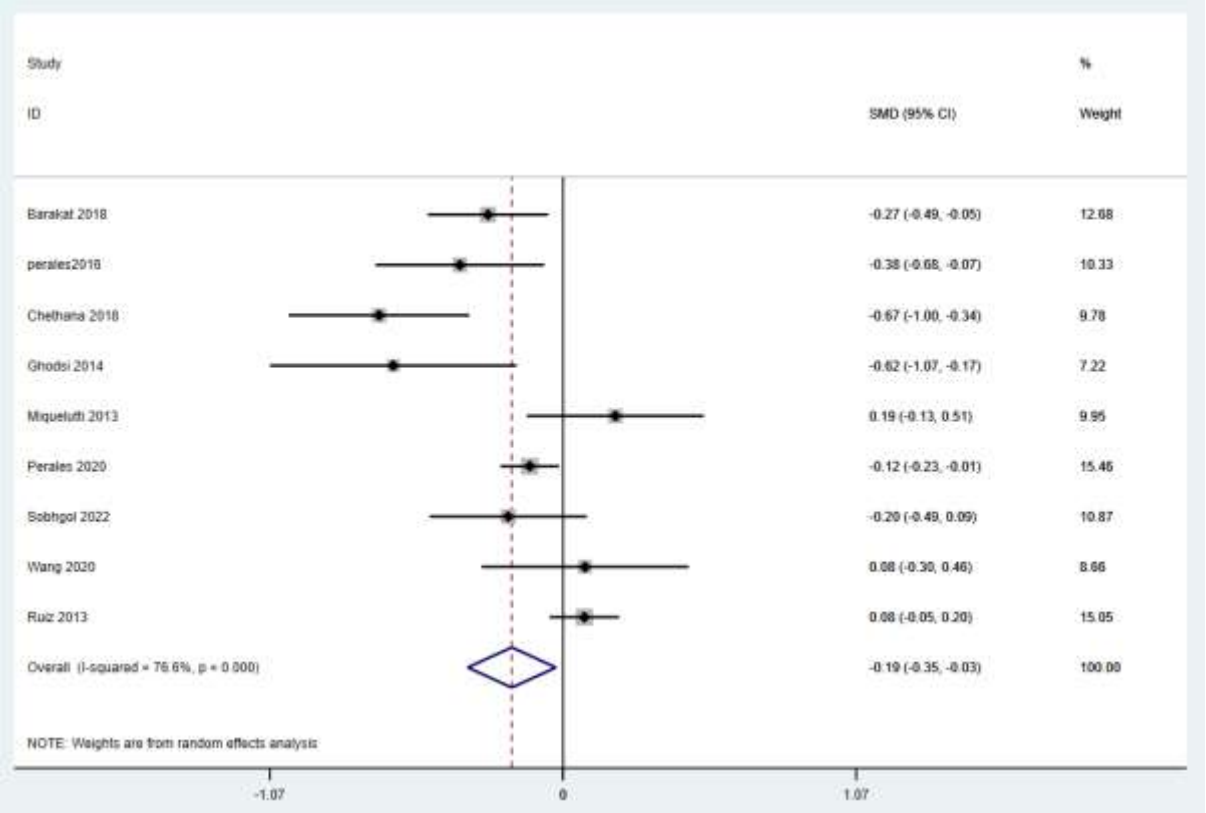
Study	SMD	[95% Conf.	Interval]	% Weight
Barakat 2018	-0.280	-0.499	-0.061	8.31
Ferreira 2019	-0.117	-0.369	0.135	7.57
perales2016	-0.324	-0.630	-0.018	6.44
Aktan, 2021	-0.427	-1.033	0.178	2.75
Salvesen 2014	0.042	-0.157	0.242	8.78
Chethana 2018	-0.663	-0.992	-0.334	6.01
Dias 2011	-0.159	-0.764	0.447	2.74
Ghodsi 2014	-0.581	-1.029	-0.134	4.22
Haakstad 2020	-0.275	-0.659	0.110	5.08
Leon-Larios 2017	0.162	-0.020	0.345	9.18
Pais 2021	-0.227	-0.580	0.126	5.58
Perales 2020	-0.095	-0.202	0.012	10.85
Sobhgol 2022	-0.114	-0.399	0.172	6.85
Wang 2020	0.106	-0.272	0.483	5.19
Ruiz 2013	0.095	-0.031	0.222	10.45
D+L pooled SMD	-0.144	-0.258	-0.030	100.00

Heterogeneity chi-squared = 42.20 (d.f. = 14) p = 0.000
I-squared (variation in SMD attributable to heterogeneity) = 66.8%
Estimate of between-study variance Tau-squared = 0.0283

Test of SMD=0 : z= 2.47 p = 0.013



First stage:

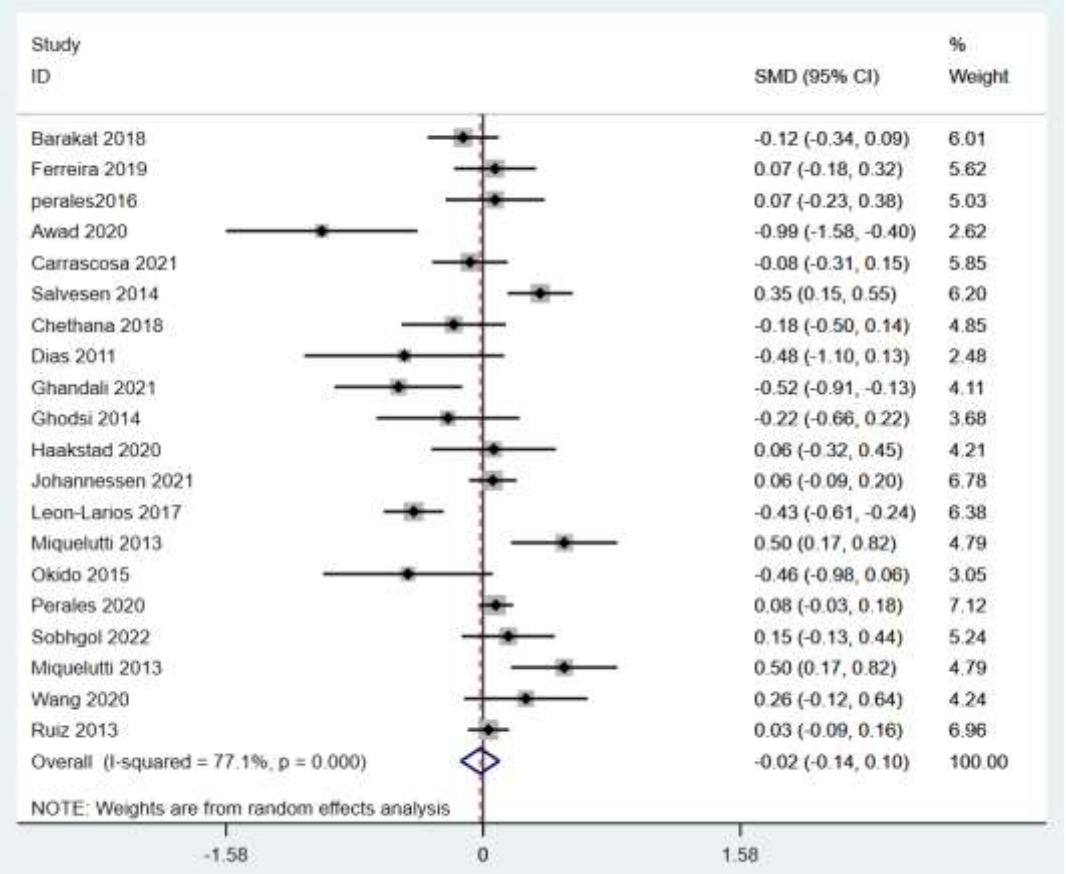


Study	SMD	[95% Conf.	Interval]	% Weight
Barakat 2018	**-0.273**	**-0.492**	**-0.054**	**12.68**
perales2016	**-0.376**	**-0.682**	**-0.069**	**10.33**
Chethana 2018	**-0.670**	**-0.999**	**-0.341**	**9.78**
Ghodsi 2014	**-0.618**	**-1.067**	**-0.169**	**7.22**
Miquelutti 2013	**0.191**	**-0.132**	**0.513**	**9.95**
Perales 2020	**-0.121**	**-0.228**	**-0.015**	**15.46**
Sobhgol 2022	**-0.200**	**-0.486**	**0.086**	**10.87**
Wang 2020	**0.080**	**-0.298**	**0.457**	**8.66**
Ruiz 2013	**0.077**	**-0.049**	**0.204**	**15.05**
D+L pooled SMD	**-0.187**	**-0.347**	**-0.026**	**100.00**

Heterogeneity chi-squared = **34.22** (d.f. = **8**) p = **0.000**
I-squared (variation in SMD attributable to heterogeneity) = **76.6%**
Estimate of between-study variance Tau-squared = **0.0404**

Test of SMD=0 : z= **2.28** p = **0.023**

Second stage:

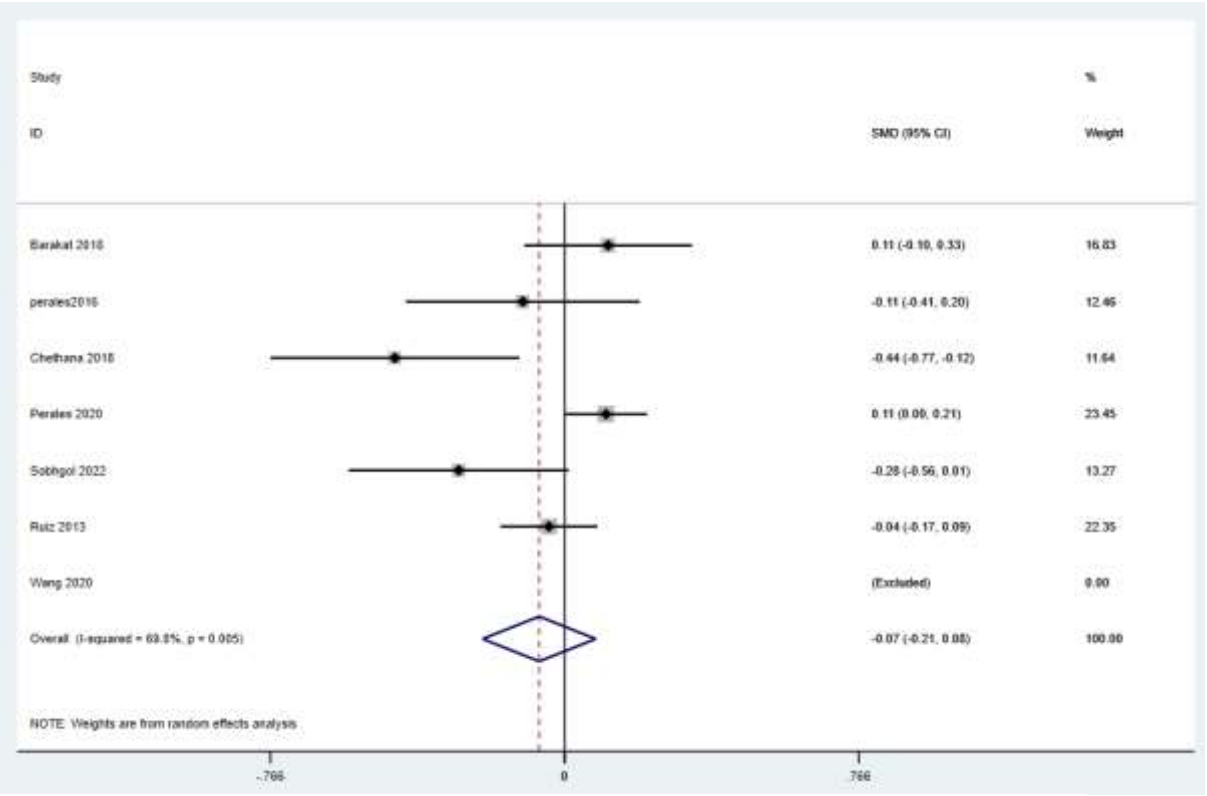


Study	SMD	[95% Conf.	Interval]	% Weight
Barakat 2018	-0.123	-0.342	0.095	6.01
Ferreira 2019	0.073	-0.179	0.325	5.62
perales2016	0.073	-0.231	0.377	5.03
Awad 2020	-0.992	-1.580	-0.403	2.62
Carrascosa 2021	-0.081	-0.313	0.151	5.85
Salvesen 2014	0.350	0.149	0.551	6.20
Chethana 2018	-0.182	-0.502	0.139	4.85
Dias 2011	-0.485	-1.099	0.129	2.48
Ghandali 2021	-0.521	-0.914	-0.128	4.11
Ghodsi 2014	-0.217	-0.656	0.223	3.68
Haakstad 2020	0.064	-0.318	0.447	4.21
Johannessen 2021	0.059	-0.087	0.205	6.78
Leon-Larios 2017	-0.427	-0.611	-0.242	6.38
Miquelutti 2013	0.497	0.171	0.824	4.79
Okido 2015	-0.462	-0.983	0.059	3.05
Perales 2020	0.078	-0.029	0.184	7.12
Sobhgol 2022	0.154	-0.132	0.440	5.24
Miquelutti 2013	0.497	0.171	0.824	4.79
Wang 2020	0.262	-0.117	0.641	4.24
Ruiz 2013	0.032	-0.094	0.158	6.96
D+L pooled SMD	-0.019	-0.137	0.099	100.00

Heterogeneity chi-squared = **83.03** (d.f. = **19**) p = **0.000**
I-squared (variation in SMD attributable to heterogeneity) = **77.1%**
Estimate of between-study variance Tau-squared = **0.0477**

Test of SMD=0 : z= **0.31** p = **0.753**

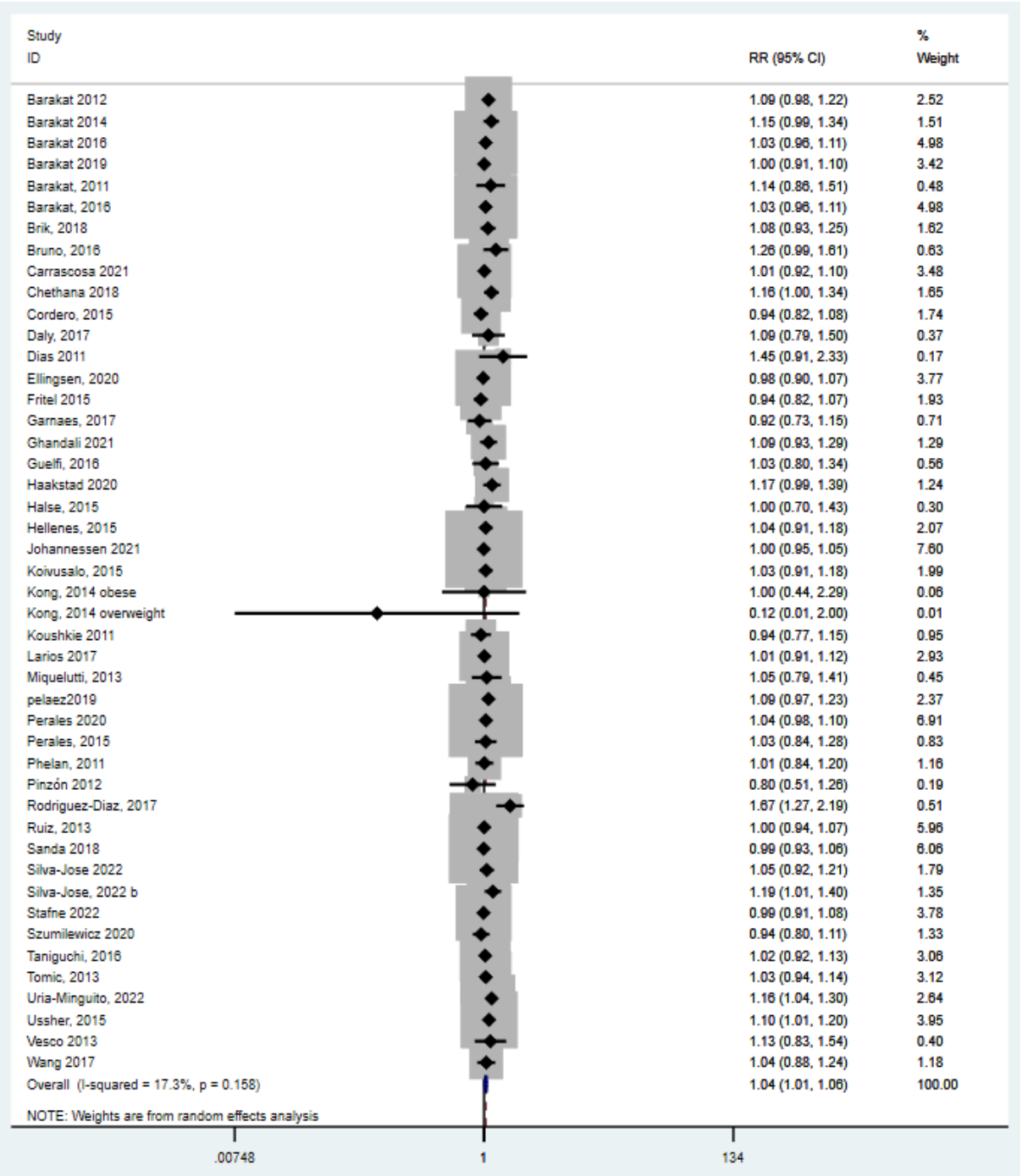
Third stage of labor:



Study	SMD	[95% Conf.	Interval]	% Weight
Barakat 2018	**0.113**	**-0.105**	**0.332**	**16.83**
perales2016	**-0.109**	**-0.413**	**0.196**	**12.46**
Chethana 2018	**-0.442**	**-0.766**	**-0.118**	**11.64**
Perales 2020	**0.108**	**0.001**	**0.215**	**23.45**
Sobhgol 2022	**-0.275**	**-0.562**	**0.011**	**13.27**
Ruiz 2013	**-0.041**	**-0.167**	**0.086**	**22.35**
Wang 2020	(Excluded)			
D+L pooled SMD	**-0.066**	**-0.213**	**0.081**	**100.00**

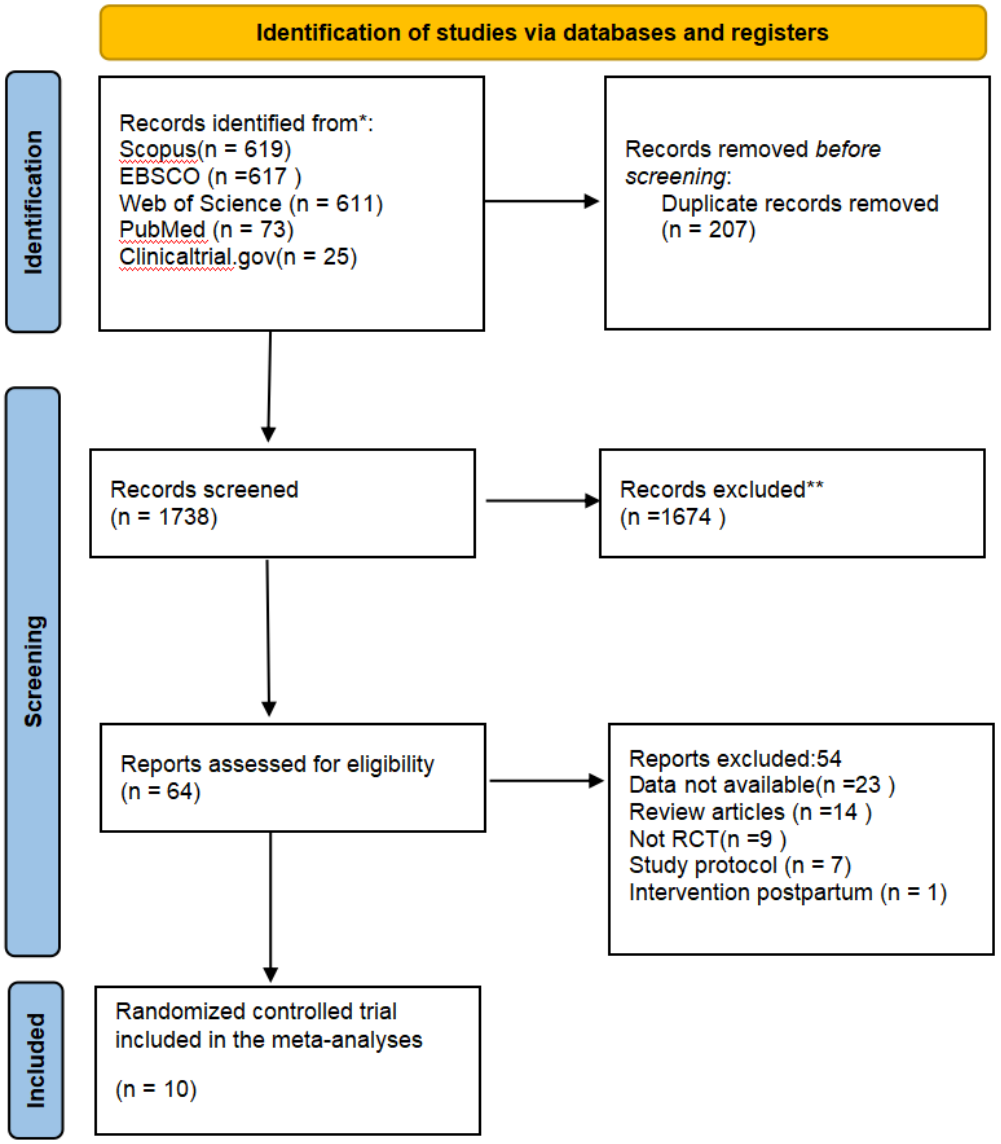
Heterogeneity chi-squared = **16.54** (d.f. = **5**) p = **0.005**
I-squared (variation in SMD attributable to heterogeneity) = **69.8%**
Estimate of between-study variance Tau-squared = **0.0210**

Test of SMD=0 : z= **0.88** p = **0.377**


Study
ID
RR (95% CI)
%
Weight
Barakat 2012 1.09 (0.98, 1.22) 2.52
Barakat 2014 1.15 (0.99, 1.34) 1.51
Barakat 2016 1.03 (0.96, 1.11) 4.98
Barakat 2019 1.00 (0.91, 1.10) 3.42
Barakat, 2011 1.14 (0.86, 1.51) 0.48
Barakat, 2016 1.03 (0.96, 1.11) 4.98
Brik, 2018 1.08 (0.93, 1.25) 1.62
Bruno, 2016 1.26 (0.99, 1.61) 0.63
Carrascosa 2021 1.01 (0.92, 1.10) 3.48
Chethana 2018 1.16 (1.00, 1.34) 1.65
Cordero, 2015 0.94 (0.82, 1.08) 1.74
Daly, 2017 1.09 (0.79, 1.50) 0.37
Dias 2011 1.45 (0.91, 2.33) 0.17
Ellingsen, 2020 0.98 (0.90, 1.07) 3.77
Fritel 2015 0.94 (0.82, 1.07) 1.93
Garnaes, 2017 0.92 (0.73, 1.15) 0.71
Ghandali 2021 1.09 (0.93, 1.29) 1.29
Guelfi, 2016 1.03 (0.80, 1.34) 0.56
Haakstad 2020 1.17 (0.99, 1.39) 1.24
Halse, 2015 1.00 (0.70, 1.43) 0.30
Hellenes, 2015 1.04 (0.91, 1.18) 2.07
Johannessen 2021 1.00 (0.95, 1.05) 7.60
Koivusalo, 2015 1.03 (0.91, 1.18) 1.99
Kong, 2014 obese 1.00 (0.44, 2.29) 0.06
Kong, 2014 overweight 0.12 (0.01, 2.00) 0.01
Koushkie 2011 0.94 (0.77, 1.15) 0.95
Larios 2017 1.01 (0.91, 1.12) 2.93
Miquelutti, 2013 1.05 (0.79, 1.41) 0.45
pelaez2019 1.09 (0.97, 1.23) 2.37
Perales 2020 1.04 (0.98, 1.10) 6.91
Perales, 2015 1.03 (0.84, 1.28) 0.83
Phelan, 2011 1.01 (0.84, 1.20) 1.16
Pinzón 2012 0.80 (0.51, 1.26) 0.19
Rodriguez-Diaz, 2017 1.67 (1.27, 2.19) 0.51
Ruiz, 2013 1.00 (0.94, 1.07) 5.96
Sanda 2018 0.99 (0.93, 1.06) 6.06
Silva-Jose 2022 1.05 (0.92, 1.21) 1.79
Silva-Jose, 2022 b 1.19 (1.01, 1.40) 1.35
Stafne 2022 0.99 (0.91, 1.08) 3.78
Szumilewicz 2020 0.94 (0.80, 1.11) 1.33
Taniguchi, 2016 1.02 (0.92, 1.13) 3.06
Tomic, 2013 1.03 (0.94, 1.14) 3.12
Uria-Minguito, 2022 1.16 (1.04, 1.30) 2.64
Ussher, 2015 1.10 (1.01, 1.20) 3.95
Vesco 2013 1.13 (0.83, 1.54) 0.40
Wang 2017 1.04 (0.88, 1.24) 1.18
Overall (I-squared = 17.3%, p = 0.158) 1.04 (1.01, 1.06) 100.00
NOTE: Weights are from random effects analysis
.00748
1
134

Study	RR	[95% Conf.	Interval]	% Weight
Barakat 2012	1.092	0.975	1.223	2.52
Barakat 2014	1.155	0.991	1.345	1.51
Barakat 2016	1.033	0.961	1.110	4.98
Barakat 2019	1.003	0.913	1.101	3.42
Barakat, 2011	1.139	0.859	1.512	0.48
Barakat, 2016	1.033	0.961	1.110	4.98
Brik, 2018	1.079	0.932	1.250	1.62
Bruno, 2016	1.263	0.988	1.614	0.63
Carrascosa 2021	1.007	0.918	1.105	3.48
Chethana 2018	1.155	0.999	1.336	1.65
Cordero, 2015	0.942	0.818	1.084	1.74
Daly, 2017	1.090	0.790	1.504	0.37
Dias 2011	1.455	0.907	2.334	0.17
Ellingsen, 2020	0.983	0.901	1.073	3.77
Fritel 2015	0.937	0.820	1.070	1.93
Garnaes, 2017	0.916	0.728	1.152	0.71
Ghandali 2021	1.092	0.925	1.290	1.29
Guelfi, 2016	1.033	0.797	1.339	0.56
Haakstad 2020	1.168	0.985	1.386	1.24
Halse, 2015	1.000	0.699	1.430	0.30
Hellenes, 2015	1.035	0.911	1.176	2.07
Johannessen 2021	0.995	0.947	1.046	7.60
Koivusalo, 2015	1.033	0.906	1.176	1.99
Kong, 2014 obese	1.000	0.438	2.285	0.06
Kong, 2014 overweigh	0.122	0.007	1.997	0.01
Koushkie 2011	0.941	0.773	1.145	0.95
Larios 2017	1.007	0.908	1.116	2.93
Miquelutti, 2013	1.054	0.787	1.411	0.45
pelaez2019	1.090	0.969	1.227	2.37
Perales 2020	1.038	0.983	1.095	6.91
Perales, 2015	1.034	0.837	1.277	0.83
Phelan, 2011	1.007	0.844	1.201	1.16

Peso de nacimiento/Birthweight



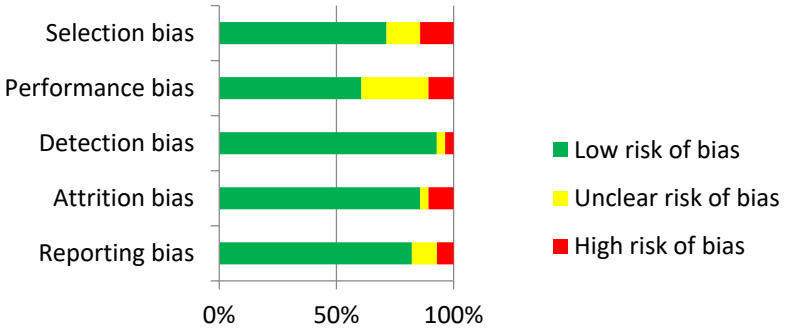
Participants
Inclusion: healthy pregnant women, aged above 18 years old, with no contraindications for physical exercise, regardless of their gestational age at the time of study entry. Absolute contraindications include: - Ruptured membranes, premature labor. - Persistent second or third-trimester bleeding/placenta previa. - Pregnancy-induced hypertension or pre-eclampsia. - Incompetent cervix. - Intrauterine growth restriction. - High-order pregnancy. - Uncontrolled Type 1 diabetes, hypertension or thyroid disease, other serious cardiovascular, respiratory or systemic disorder

Intervention(s)
The target intervention will be related to the different models that include any format of physical activity during pregnancy (individual/group), (autonomous/supervised), (face-to-face/online) (acute and chronic exercise) and cointerventions (ex.: nutrition). It will be recorded the Intensity, duration, frequency, type of exercise, trimester of pregnancy duration and adherence to the program.

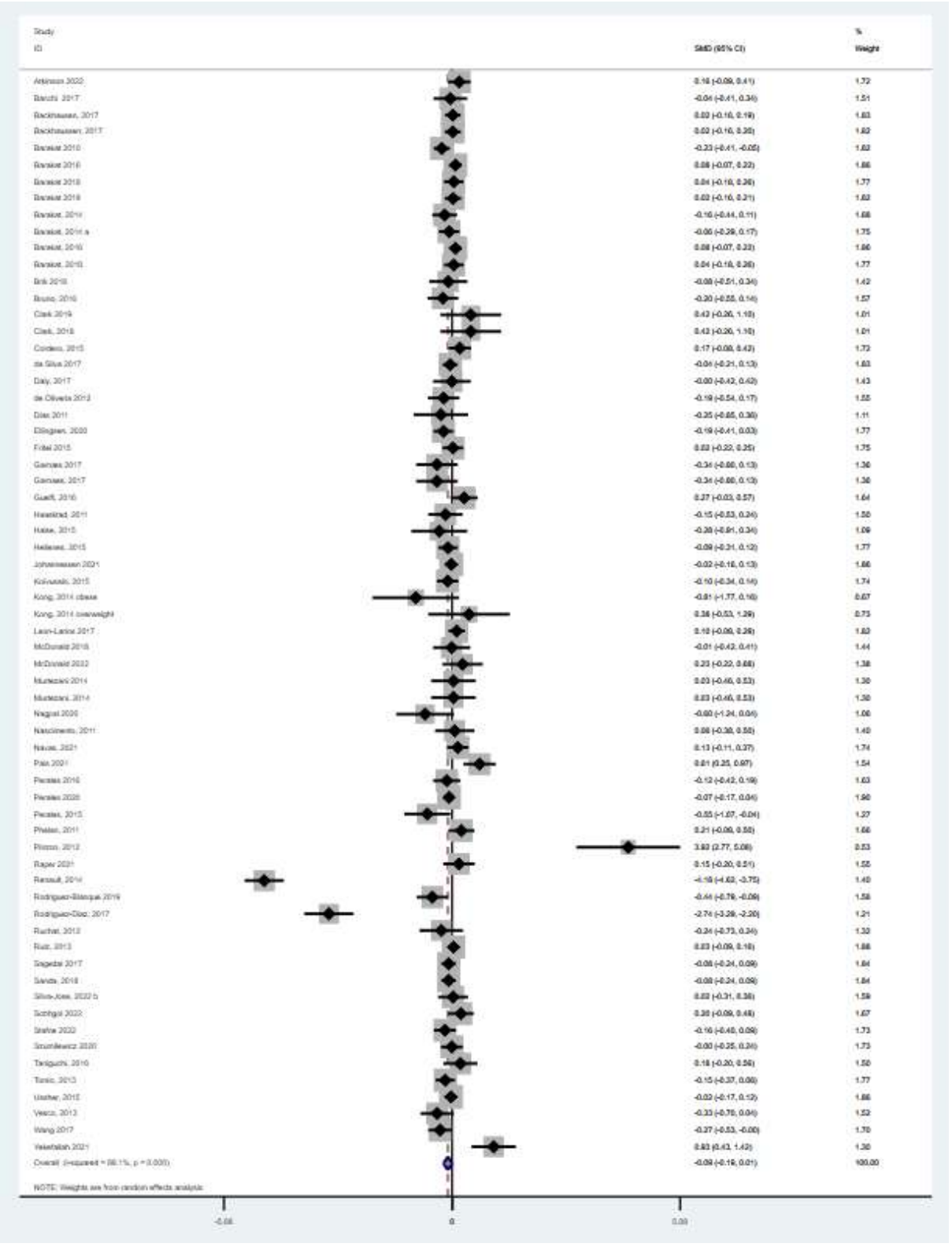
Comparator(s)
The comparison will be based on not practicing physical activity considering the non-intervention group of the selected studies. Also, we will include other systematic reviews to compare other outcomes of these variables with ours.

Main outcome
Birth weight

Additional outcome(s)
Macrosomia frequencies, large for gestational age and small for gestational age.



Birth weight


Study
ID
SMD (95% CI)
%
Weight
Atkinson 2022
Bacchi 2017
Backhausen, 2017
Backhausen, 2017
Bavaloi 2010
Bavaloi 2016
Bavaloi 2018
Bavaloi 2018
Bavaloi, 2011
Bavaloi, 2011 a
Bavaloi, 2016
Bavaloi, 2016
Birk 2019
Bruno, 2016
Clark 2019
Clark, 2018
Cordeiro, 2015
da Silva 2017
Daly, 2017
de Oliveira 2012
Dias 2011
Ellingsen, 2020
Fidel 2015
Gamaas 2017
Gamaas, 2017
Guelfi, 2016
Hasselrad, 2011
Hatse, 2015
Heikkeia, 2015
Johannessen 2021
Kolvisaski, 2015
Kong, 2014 obese
Kong, 2014 overweight
Leon-Larios 2017
McDonald 2016
McDonald 2022
Munezawa 2014
Munezawa, 2014
Nagpal 2020
Nascimento, 2011
Nauas, 2021
Pais 2021
Perales 2016
Perales 2020
Perales, 2015
Phelan, 2011
Pinzon, 2012
Rajav 2021
Renault, 2014
Rodriguez-Blanque 2019
Rodriguez-Diaz, 2017
Ruchat, 2013
Ruiz, 2013
Sagedal 2017
Sandy, 2018
Silva-Jose, 2022 b
Szchgol 2022
Stehle 2020
Szumilewicz 2020
Taniguchi, 2016
Tonic, 2013
Usaher, 2012
Veeck, 2013
Wang 2017
Yekefallah 2021
Overall (I-squared = 88.1%, p = 0.000)
NOTE: Weights are from random effects analysis
-0.68
0
0.68

Study	SMD	[95% Conf.	Interval]	% Weight
Atkinson 2022	0.160	-0.093	0.413	1.72
Bacchi 2017	-0.037	-0.412	0.338	1.51
Backhausen, 2017	0.017	-0.158	0.192	1.83
Backhaussen, 2017	0.017	-0.164	0.198	1.82
Barakat 2010	-0.227	-0.408	-0.046	1.82
Barakat 2016	0.076	-0.065	0.218	1.86
Barakat 2018	0.039	-0.180	0.257	1.77
Barakat 2019	0.022	-0.161	0.206	1.82
Barakat, 2014	-0.165	-0.443	0.114	1.68
Barakat, 2014 a	-0.064	-0.294	0.167	1.75
Barakat, 2016	0.076	-0.065	0.218	1.86
Barakat, 2018	0.039	-0.180	0.257	1.77
Brik 2018	-0.084	-0.509	0.342	1.42
Bruno, 2016	-0.204	-0.548	0.140	1.57
Clark 2019	0.418	-0.260	1.095	1.01
Clark, 2018	0.418	-0.260	1.095	1.01
Cordero, 2015	0.173	-0.078	0.424	1.72
da Silva 2017	-0.041	-0.210	0.127	1.83
Daly, 2017	-0.003	-0.424	0.417	1.43
de Oliveria 2012	-0.188	-0.540	0.165	1.55
Dias 2011	-0.247	-0.855	0.360	1.11
Ellingsen, 2020	-0.191	-0.411	0.029	1.77
Fritel 2015	0.018	-0.215	0.252	1.75
Garnæs 2017	-0.336	-0.799	0.126	1.36
Garnaes, 2017	-0.336	-0.799	0.126	1.36
Guelfi, 2016	0.269	-0.034	0.572	1.64
Haasktad, 2011	-0.146	-0.529	0.237	1.50
Halse, 2015	-0.285	-0.908	0.339	1.09
Hellenes, 2015	-0.091	-0.306	0.125	1.77
Johannessen 2021	-0.018	-0.164	0.129	1.86

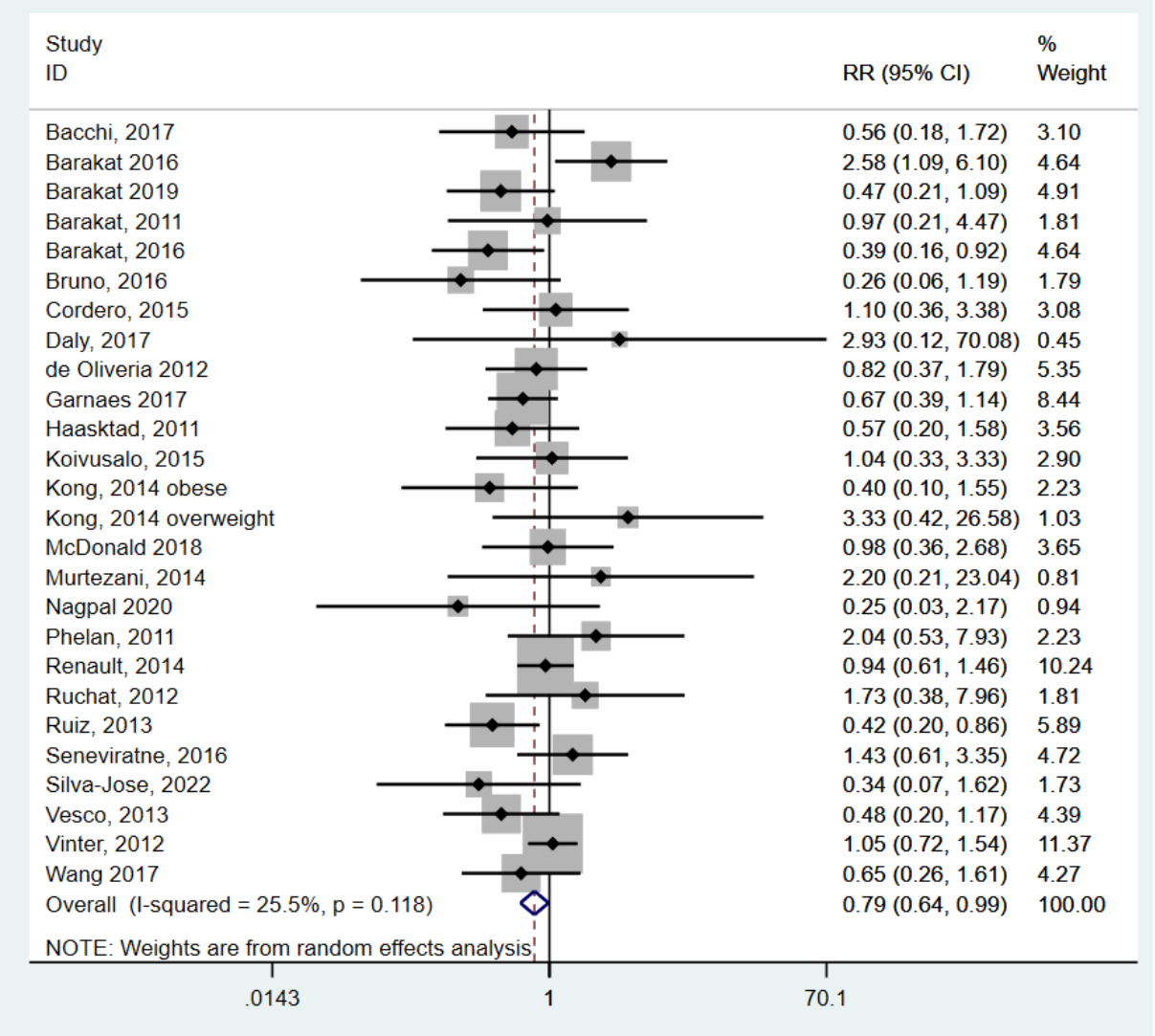
Koivusalo, 2015	-0.097	-0.337	0.143	1.74
Kong, 2014 obese	-0.808	-1.773	0.158	0.67
Kong, 2014 overweigh	0.377	-0.532	1.287	0.73
Leon-Larios 2017	0.104	-0.078	0.287	1.82
McDonald 2018	-0.008	-0.422	0.407	1.44
McDonald 2022	0.233	-0.216	0.683	1.38
Murtezani 2014	0.031	-0.464	0.525	1.30
Murtezani, 2014	0.031	-0.464	0.525	1.30
Nagpal 2020	-0.601	-1.242	0.041	1.06
Nascimento, 2011	0.060	-0.378	0.499	1.40
Navas, 2021	0.128	-0.110	0.367	1.74
Pais 2021	0.614	0.254	0.974	1.54
Perales 2016	-0.117	-0.421	0.188	1.63
Perales 2020	-0.068	-0.175	0.039	1.90
Perales, 2015	-0.552	-1.066	-0.038	1.27
Phelan, 2011	0.207	-0.084	0.499	1.66
Pinzon, 2012	3.924	2.768	5.080	0.53
Raper 2021	0.154	-0.198	0.506	1.55
Renault, 2014	-4.184	-4.620	-3.748	1.40
Rodriguez-Blanque 20	-0.440	-0.789	-0.091	1.56
Rodriguez-Diaz, 2017	-2.744	-3.293	-2.195	1.21
Ruchat, 2012	-0.241	-0.725	0.244	1.32
Ruiz, 2013	0.034	-0.093	0.160	1.88
Sagedal 2017	-0.076	-0.237	0.085	1.84
Sanda, 2018	-0.076	-0.238	0.085	1.84
Silva-Jose, 2022 b	0.023	-0.310	0.355	1.59
Sobhgol 2022	0.197	-0.089	0.483	1.67
Stafne 2022	-0.159	-0.405	0.087	1.73
Szumilewicz 2020	-0.004	-0.247	0.239	1.73
Taniguchi, 2016	0.185	-0.195	0.564	1.50
Tomic, 2013	-0.151	-0.366	0.064	1.77
Ussher, 2015	-0.024	-0.170	0.123	1.86
Vesco, 2013	-0.333	-0.703	0.037	1.52
Wang 2017	-0.266	-0.527	-0.004	1.70

Yekefallah 2021	**0.927**	**0.433**	**1.420**	**1.30**
D+L pooled SMD	**-0.092**	**-0.190**	**0.006**	**100.00**

Heterogeneity chi-squared = **585.60** (d.f. = **64**) p = **0.000**
I-squared (variation in SMD attributable to heterogeneity) = **89.1%**
Estimate of between-study variance Tau-squared = **0.1294**

Test of SMD=0 : z= **1.84** p = **0.066**

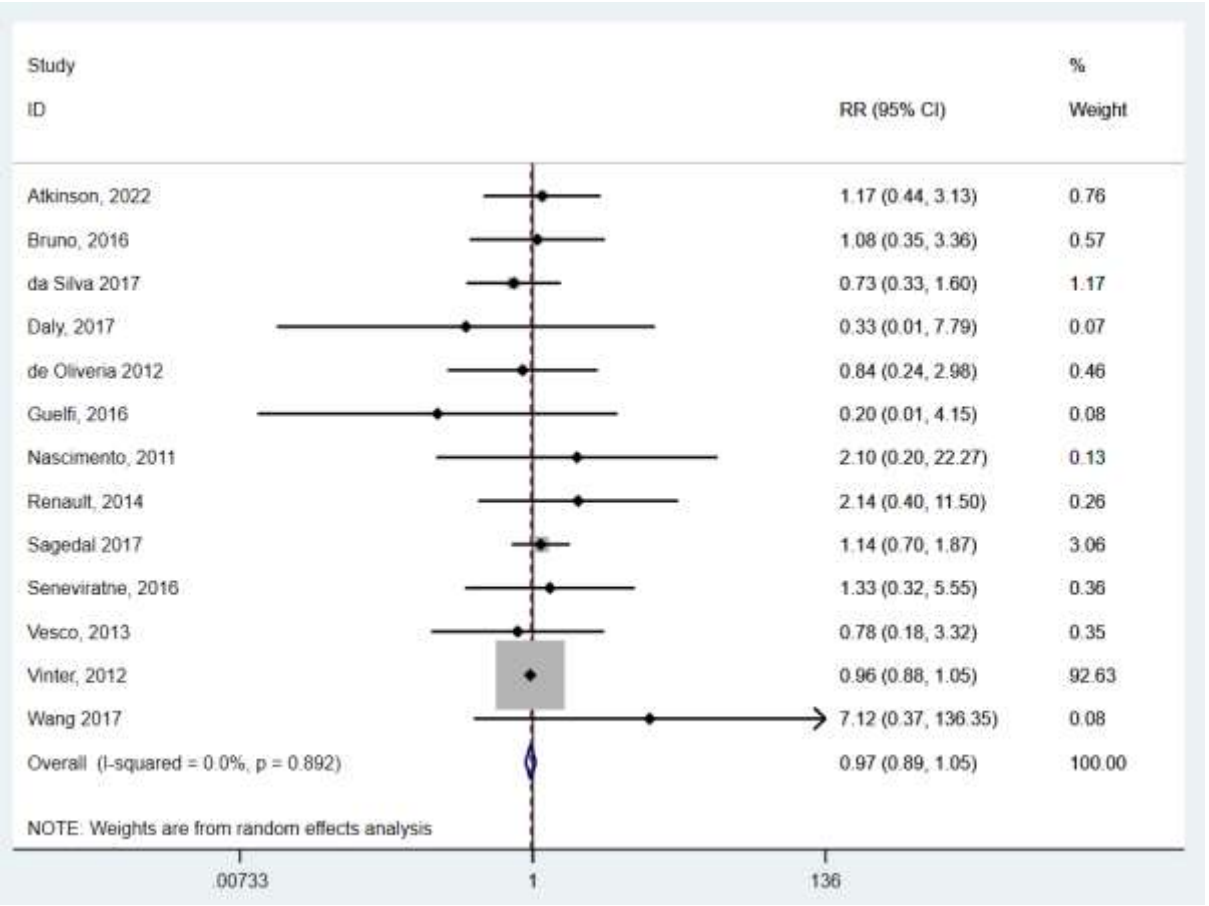
Macrosomia



Study	RR	[95% Conf.	Interval]	% Weight
Bacchi, 2017	0.562	0.184	1.718	3.10
Barakat 2016	2.578	1.089	6.101	4.64
Barakat 2019	0.474	0.207	1.086	4.91
Barakat, 2011	0.971	0.211	4.469	1.81
Barakat, 2016	0.390	0.165	0.923	4.64
Bruno, 2016	0.257	0.055	1.190	1.79
Cordero, 2015	1.103	0.360	3.381	3.08
Daly, 2017	2.933	0.123	70.081	0.45
de Oliveria 2012	0.818	0.375	1.786	5.35
Garnaes 2017	0.666	0.390	1.138	8.44
Haasktad, 2011	0.566	0.203	1.577	3.56
Koivusalo, 2015	1.042	0.326	3.331	2.90
Kong, 2014 obese	0.400	0.103	1.550	2.23
Kong, 2014 overweigh	3.333	0.418	26.583	1.03
McDonald 2018	0.976	0.356	2.676	3.65
Murtezani, 2014	2.200	0.210	23.045	0.81
Nagpal 2020	0.246	0.028	2.168	0.94
Phelan, 2011	2.044	0.527	7.927	2.23
Renault, 2014	0.942	0.610	1.456	10.24
Ruchat, 2012	1.731	0.376	7.959	1.81
Ruiz, 2013	0.417	0.201	0.862	5.89
Seneviratne, 2016	1.429	0.610	3.348	4.72
Silva-Jose, 2022	0.338	0.071	1.618	1.73
Vesco, 2013	0.478	0.195	1.170	4.39
Vinter, 2012	1.053	0.720	1.539	11.37
Wang 2017	0.648	0.260	1.611	4.27
D+L pooled RR	0.795	0.640	0.987	100.00

Heterogeneity chi-squared = **33.56** (d.f. = **25**) p = **0.118**
I-squared (variation in RR attributable to heterogeneity) = **25.5%**
Estimate of between-study variance Tau-squared = **0.0700**

Test of RR=1 : z= **2.08** p = **0.038**

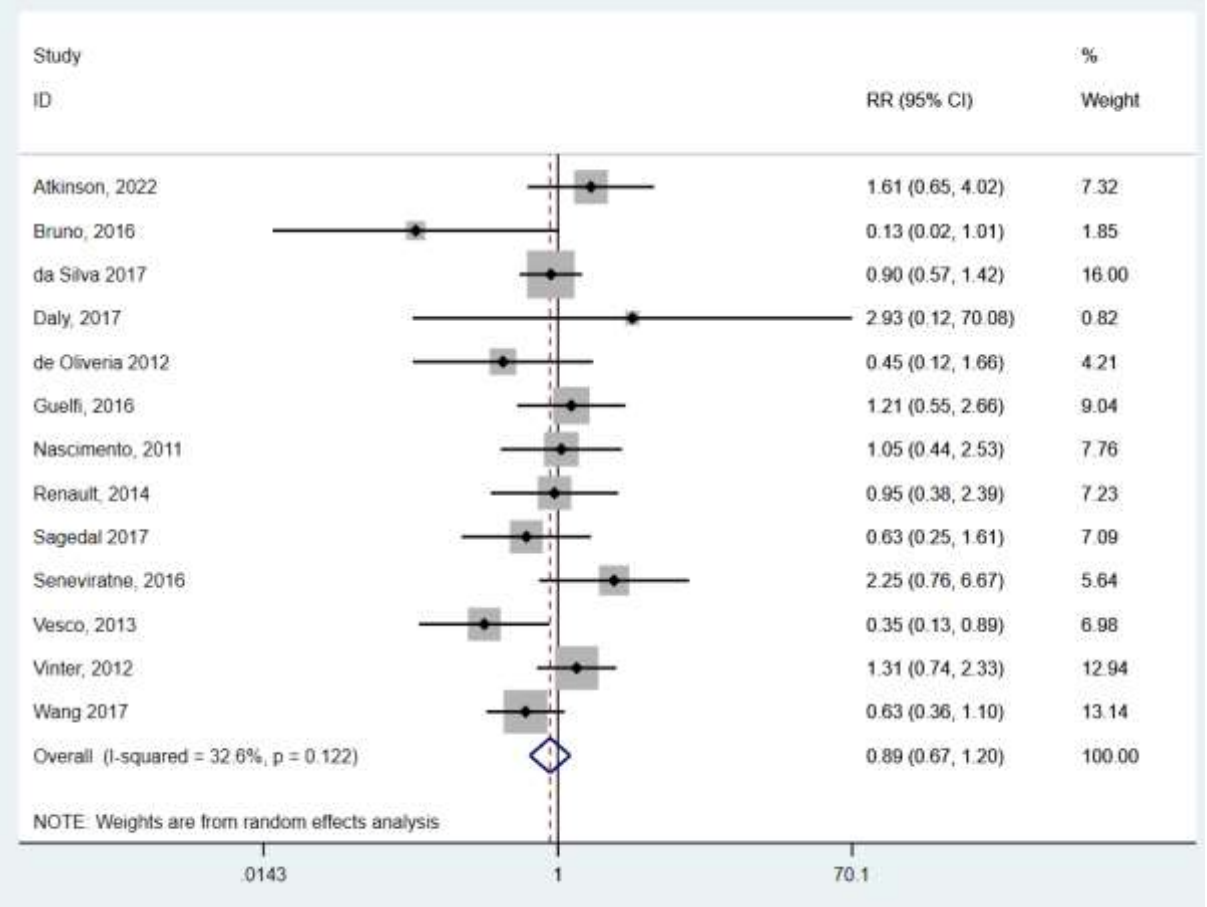

Study
ID
RR (95% CI)
%
Weight
Atkinson, 2022
1.17 (0.44, 3.13)
0.76
Bruno, 2016
1.08 (0.35, 3.36)
0.57
da Silva 2017
0.73 (0.33, 1.60)
1.17
Daly, 2017
0.33 (0.01, 7.79)
0.07
de Oliveria 2012
0.84 (0.24, 2.98)
0.46
Guelfi, 2016
0.20 (0.01, 4.15)
0.08
Nascimento, 2011
2.10 (0.20, 22.27)
0.13
Renault, 2014
2.14 (0.40, 11.50)
0.26
Sagedal 2017
1.14 (0.70, 1.87)
3.06
Seneviratne, 2016
1.33 (0.32, 5.55)
0.36
Vesco, 2013
0.78 (0.18, 3.32)
0.35
Vinter, 2012
0.96 (0.88, 1.05)
92.63
Wang 2017
7.12 (0.37, 136.35)
0.08
Overall (I-squared = 0.0%, p = 0.892)
0.97 (0.89, 1.05)
100.00
NOTE: Weights are from random effects analysis
.00733
1
136

Study	RR	[95% Conf.	Interval]	% Weight
Atkinson, 2022	**1.172**	**0.439**	**3.129**	**0.76**
Bruno, 2016	**1.078**	**0.346**	**3.359**	**0.57**
da Silva 2017	**0.725**	**0.329**	**1.601**	**1.17**
Daly, 2017	**0.326**	**0.014**	**7.787**	**0.07**
de Oliveria 2012	**0.844**	**0.239**	**2.980**	**0.46**
Guelfi, 2016	**0.202**	**0.010**	**4.153**	**0.08**
Nascimento, 2011	**2.103**	**0.199**	**22.270**	**0.13**
Renault, 2014	**2.144**	**0.400**	**11.501**	**0.26**
Sagedal 2017	**1.144**	**0.701**	**1.868**	**3.06**
Seneviratne, 2016	**1.333**	**0.320**	**5.549**	**0.36**
Vesco, 2013	**0.777**	**0.182**	**3.316**	**0.35**
Vinter, 2012	**0.959**	**0.877**	**1.048**	**92.63**
Wang 2017	**7.124**	**0.372**	**136.353**	**0.08**
D+L pooled RR	**0.965**	**0.886**	**1.052**	**100.00**

Heterogeneity chi-squared = **6.44** (d.f. = **12**) p = **0.892**
I-squared (variation in RR attributable to heterogeneity) = **0.0%**
Estimate of between-study variance Tau-squared = **0.0000**

Test of RR=1 : z= **0.80** p = **0.422**

Large for gestational age (LGA)

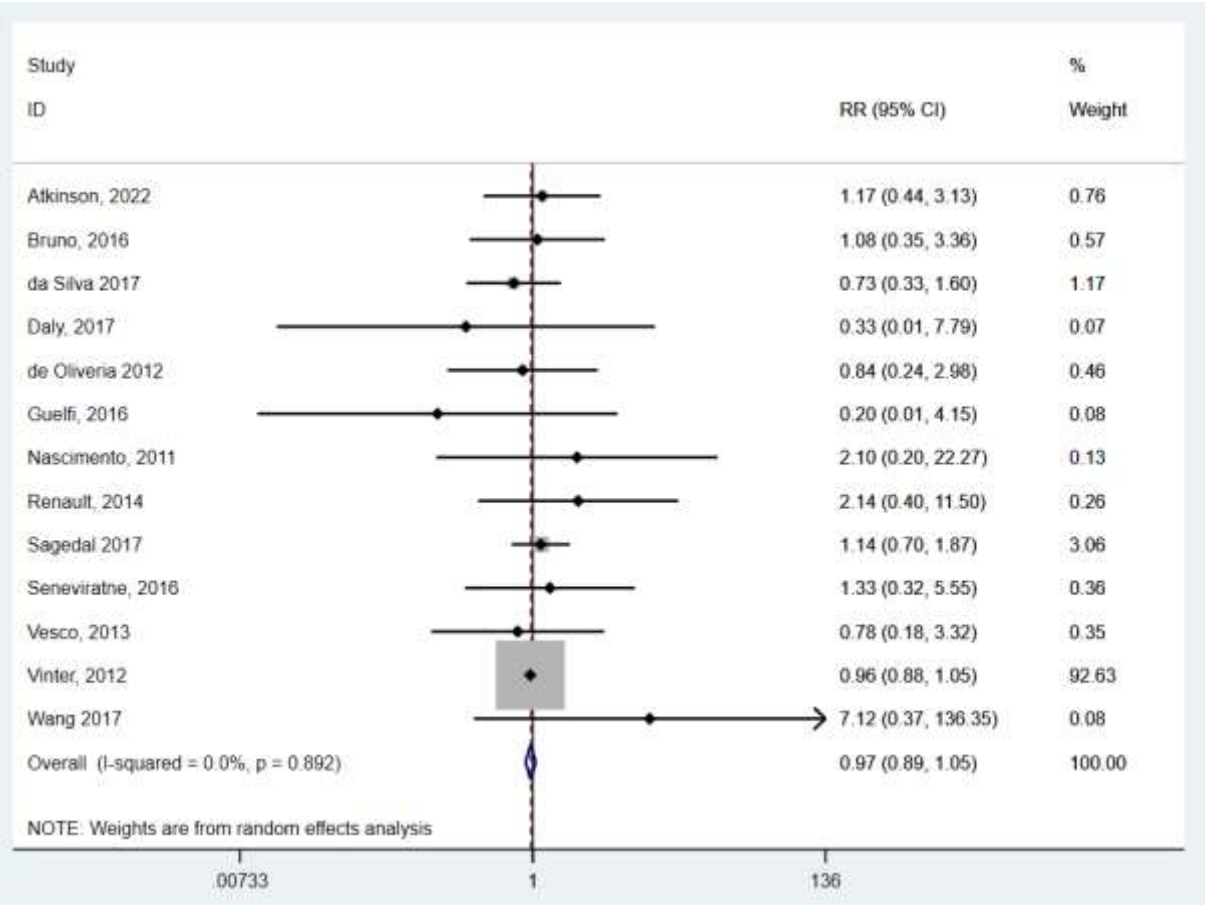


Study	RR	[95% Conf.	Interval]	% Weight
Atkinson, 2022	1.611	0.646	4.016	7.32
Bruno, 2016	0.128	0.016	1.014	1.85
da Silva 2017	0.903	0.575	1.420	16.00
Daly, 2017	2.933	0.123	70.081	0.82
de Oliveria 2012	0.452	0.123	1.660	4.21
Guelfi, 2016	1.214	0.555	2.657	9.04
Nascimento, 2011	1.051	0.438	2.526	7.76
Renault, 2014	0.953	0.379	2.393	7.23
Sagedal 2017	0.634	0.249	1.614	7.09
Seneviratne, 2016	2.250	0.759	6.666	5.64
Vesco, 2013	0.345	0.134	0.887	6.98
Vinter, 2012	1.312	0.739	2.330	12.94
Wang 2017	0.626	0.356	1.103	13.14
D+L pooled RR	0.893	0.667	1.195	100.00

Heterogeneity chi-squared = 17.80 (d.f. = 12) p = 0.122
I-squared (variation in RR attributable to heterogeneity) = 32.6%
Estimate of between-study variance Tau-squared = 0.0849

Test of RR=1 : z= 0.76 p = 0.447

Small for gestational age

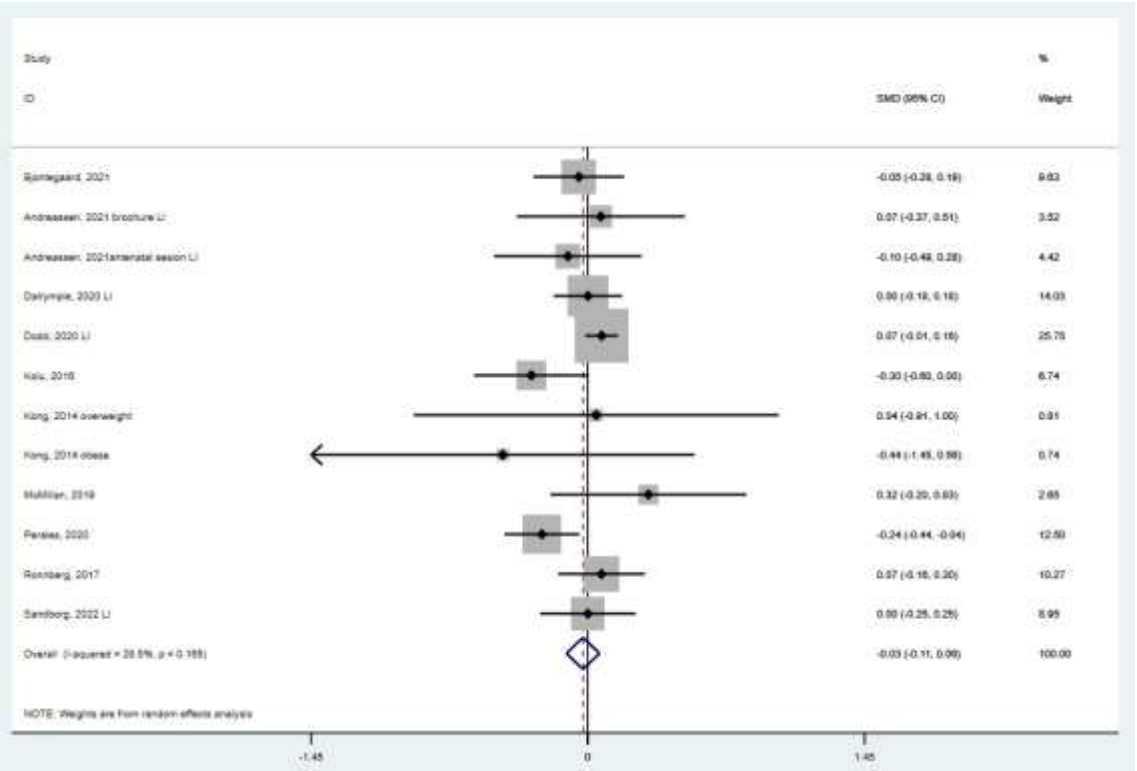

Study
ID
RR (95% CI)
%
Weight
Atkinson, 2022
1.17 (0.44, 3.13)
0.76
Bruno, 2016
1.08 (0.35, 3.36)
0.57
da Silva 2017
0.73 (0.33, 1.60)
1.17
Daly, 2017
0.33 (0.01, 7.79)
0.07
de Oliveria 2012
0.84 (0.24, 2.98)
0.46
Guelfi, 2016
0.20 (0.01, 4.15)
0.08
Nascimento, 2011
2.10 (0.20, 22.27)
0.13
Renault, 2014
2.14 (0.40, 11.50)
0.26
Sagedal 2017
1.14 (0.70, 1.87)
3.06
Seneviratne, 2016
1.33 (0.32, 5.55)
0.36
Vesco, 2013
0.78 (0.18, 3.32)
0.35
Vinter, 2012
0.96 (0.88, 1.05)
92.63
Wang 2017
7.12 (0.37, 136.35)
0.08
Overall (I-squared = 0.0%, p = 0.892)
0.97 (0.89, 1.05)
100.00
NOTE: Weights are from random effects analysis
.00733
1
136

Study	RR	[95% Conf.	Interval]	% Weight
Atkinson, 2022	1.172	0.439	3.129	0.76
Bruno, 2016	1.078	0.346	3.359	0.57
da Silva 2017	0.725	0.329	1.601	1.17
Daly, 2017	0.326	0.014	7.787	0.07
de Oliveria 2012	0.844	0.239	2.980	0.46
Guelfi, 2016	0.202	0.010	4.153	0.08
Nascimento, 2011	2.103	0.199	22.270	0.13
Renault, 2014	2.144	0.400	11.501	0.26
Sagedal 2017	1.144	0.701	1.868	3.06
Seneviratne, 2016	1.333	0.320	5.549	0.36
Vesco, 2013	0.777	0.182	3.316	0.35
Vinter, 2012	0.959	0.877	1.048	92.63
Wang 2017	7.124	0.372	136.353	0.08
D+L pooled RR	0.965	0.886	1.052	100.00

Heterogeneity chi-squared = **6.44** (d.f. = **12**) p = **0.892**
I-squared (variation in RR attributable to heterogeneity) = **0.0%**
Estimate of between-study variance Tau-squared = **0.0000**

Test of RR=1 : z= **0.80** p = **0.422**

General infant obesity:

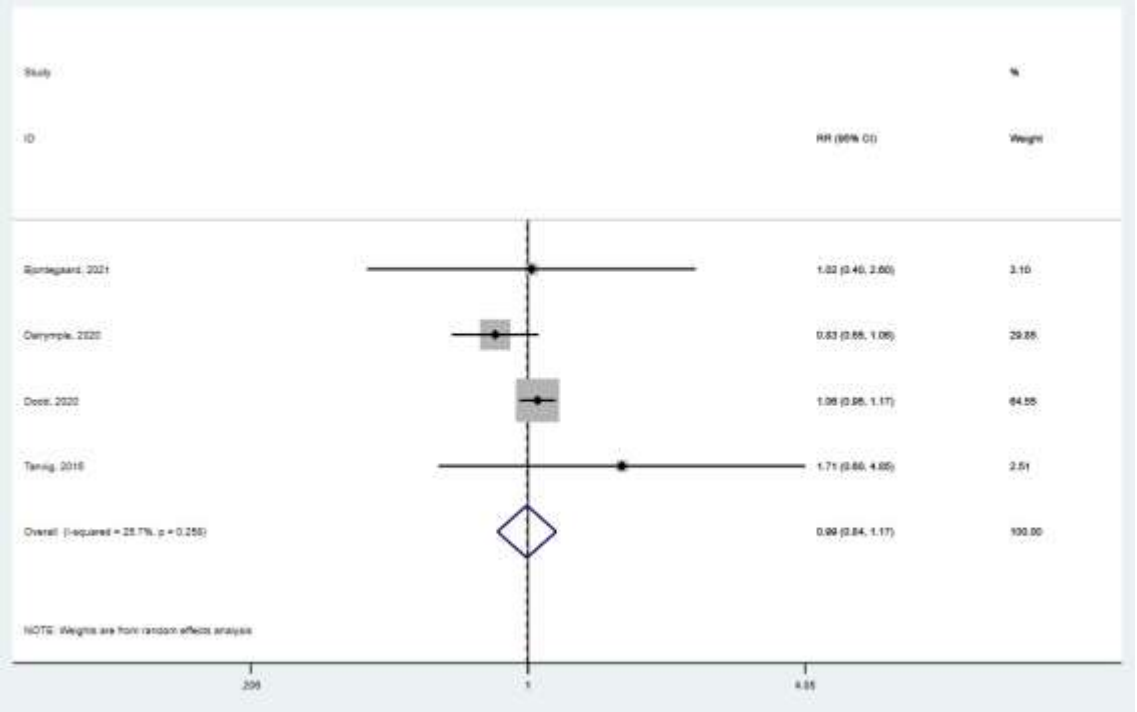


Study	SMD	[95% Conf.	Interval]	% Weight
Bjontegaard, 2021	-0.047	-0.284	0.190	9.63
Andreassen, 2021 bro	0.067	-0.371	0.506	3.52
Andreassen, 2021ante	-0.104	-0.490	0.281	4.42
Dalrymple, 2020 LI	0.000	-0.178	0.178	14.03
Dodd, 2020 LI	0.072	-0.013	0.157	25.75
Kolu, 2016	-0.295	-0.595	0.004	6.74
Kong, 2014 overweigh	0.044	-0.909	0.996	0.81
Kong, 2014 obese	-0.444	-1.446	0.557	0.74
McMillan, 2019	0.316	-0.196	0.828	2.65
Perales, 2020	-0.240	-0.436	-0.045	12.50
Ronnberg, 2017	0.071	-0.155	0.298	10.27
Sandborg, 2022 LI	0.000	-0.249	0.249	8.95
D+L pooled SMD	-0.025	-0.112	0.062	100.00

Heterogeneity chi-squared = **15.39** (d.f. = **11**) p = **0.165**
I-squared (variation in SMD attributable to heterogeneity) = **28.5%**
Estimate of between-study variance Tau-squared = **0.0057**

Test of SMD=0 : z= **0.57** p = **0.568**

Obesity (yes/no)



Study	RR	[95% Conf.	Interval]	% Weight
Bjontegaard, 2021	**1.019**	**0.400**	**2.599**	**3.10**
Dalrymple, 2020	**0.829**	**0.647**	**1.063**	**29.85**
Dodd, 2020	**1.056**	**0.952**	**1.170**	**64.55**
Tanvig, 2015	**1.706**	**0.600**	**4.854**	**2.51**
D+L pooled RR	**0.993**	**0.840**	**1.175**	**100.00**

Heterogeneity chi-squared = **4.04** (d.f. = **3**) p = **0.258**
I-squared (variation in RR attributable to heterogeneity) = **25.7%**
Estimate of between-study variance Tau-squared = **0.0086**

Test of RR=1 : z= **0.08** p = **0.936**

GRADE:

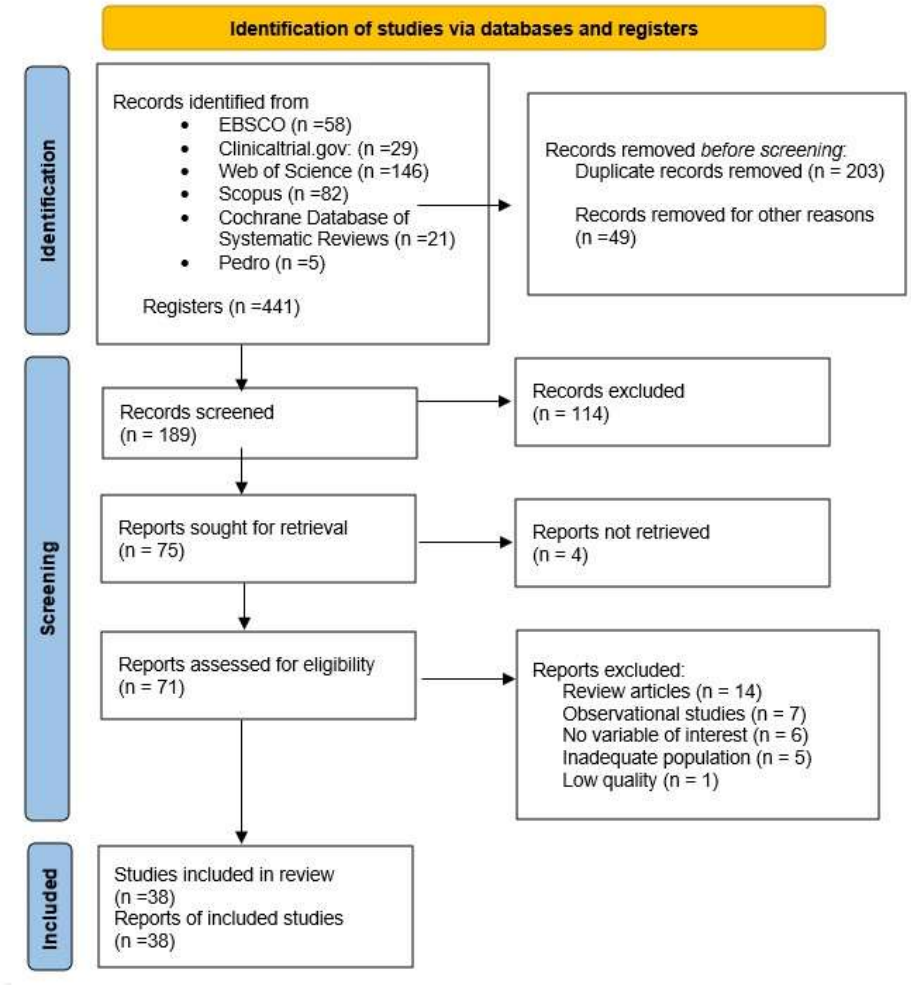
Evaluación de certeza							Resumen de los resultados					Importancia
Nº de estudios	Diseño de estudio	Riesgo de sesgo	Inconsistencia	Evidencia indirecta	Imprecisión	Otras consideraciones	Nº de pacientes: Actividad física	Nº de pacientes: Cuidados habituales	Efecto: Relativo (95% CI)	Efecto: Absoluto (95% CI)	Certeza	
Obesidad infantil												
12	ensayos aleatorios	serio [a]	no es serio	no es serio	serio [b]	gradiente de dosis-respuesta	2895	2830	-	0 (0 a 0)	⨁⨁⨁◯ Moderado	CRÍTICO

REPORT

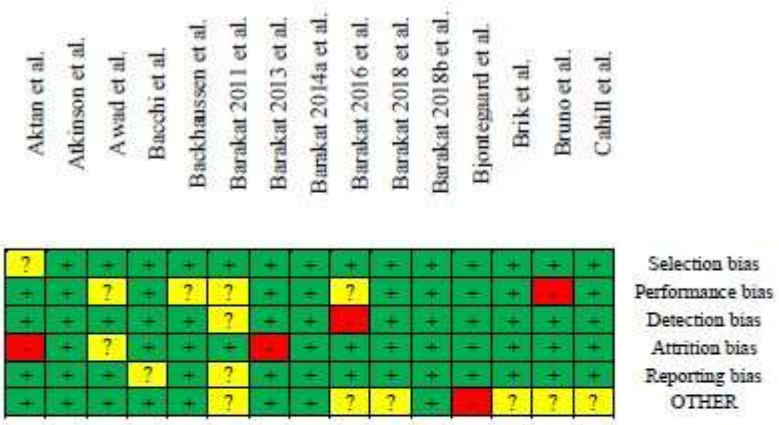
Table 1. PICOS Strategy

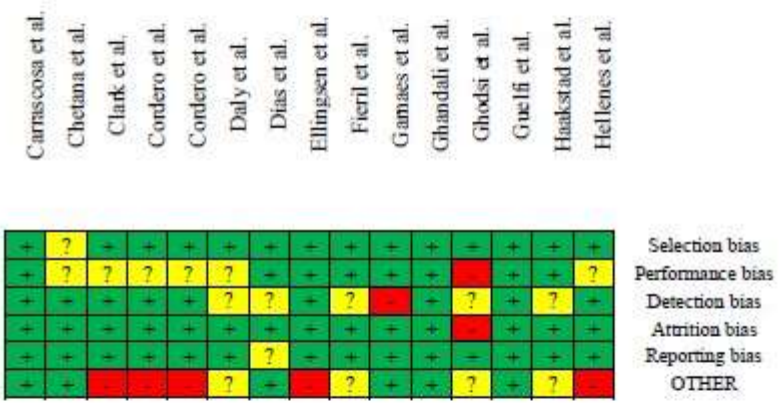
PICOS	DEFINITIONS
Population	pregnant women
Intervention	Interventions that include physical activity: • Individual/group • Autonomous/supervised • Face-to-face/online • Co-intervention (ex.: nutrition)
Comparison	Data based on non-practice of physical activity. • Intervention – non-intervention
Outcome	The main study variable
Study design	Randomized clinical trials

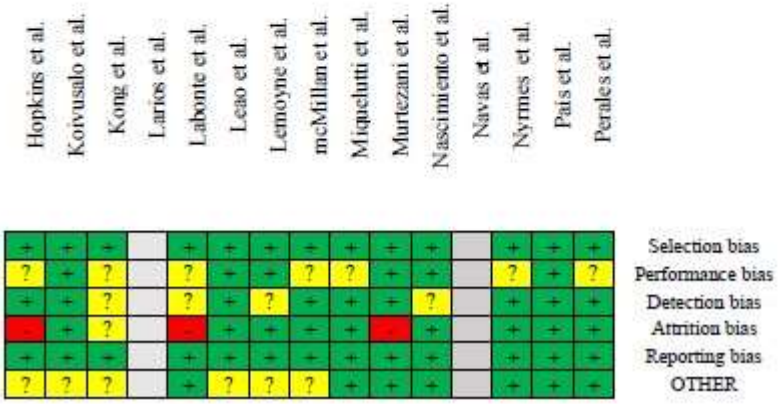
FLOW CHART

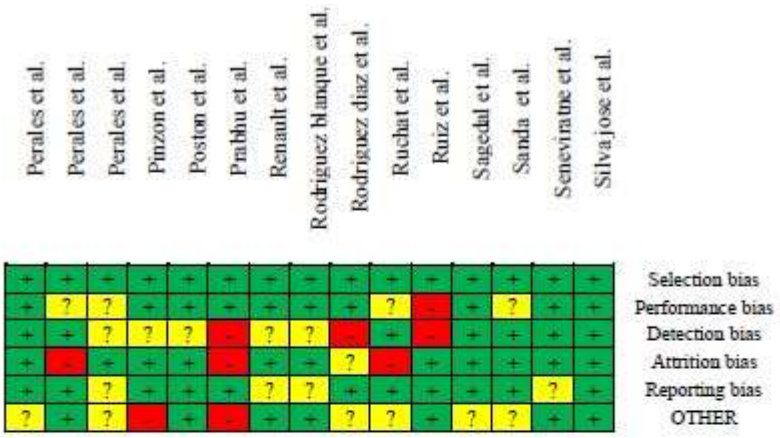


RISK OF BIAS:


Aktan et al.
Atkinson et al.
Awad et al.
Bacchi et al.
Backhaussen et al.
Barakat 2011 et al.
Barakat 2013 et al.
Barakat 2014a et al.
Barakat 2016 et al.
Barakat 2018 et al.
Barakat 2018b et al.
Bjontegaard et al.
Brik et al.
Bruno et al.
Cahill et al.
Selection bias
Performance bias
Detection bias
Attrition bias
Reporting bias
OTHER


Carrascosa et al.
Chetana et al.
Clark et al.
Cordero et al.
Cordero et al.
Daly et al.
Dias et al.
Ellingsen et al.
Fieril et al.
Gamaes et al.
Ghandali et al.
Ghodsi et al.
Guelfi et al.
Haakstad et al.
Hellenes et al.
Selection bias
Performance bias
Detection bias
Attrition bias
Reporting bias
OTHER


Hopkins et al.
Koivusalo et al.
Kong et al.
Larios et al.
Labonte et al.
Leao et al.
Lemoyne et al.
mcMillan et al.
Miquelutti et al.
Murtezani et al.
Nascimiento et al.
Navas et al.
Nyrmes et al.
Pais et al.
Perales et al.
Selection bias
Performance bias
Detection bias
Attrition bias
Reporting bias
OTHER


Perales et al.
Perales et al.
Perales et al.
Pinzon et al.
Poston et al.
Prabhu et al.
Renault et al.
Rodriguez blanque et al.
Rodriguez diaz et al.
Ruchat et al.
Ruiz et al.
Sagedal et al.
Sanda et al.
Seneviratne et al.
Silva jose et al.
Selection bias
Performance bias
Detection bias
Attrition bias
Reporting bias
OTHER


Silva jose
Sobhgol et al.
Taniguchi et al.
Toosi et al.
Trak fellermeier et al.
Uria minguito et al.
Ussher et al.
Vesco et al.
Vinter et al.
Wang et al.
Yekefallah et al.
Selection bias
Performance bias
Detection bias
Attrition bias
Reporting bias
OTHER

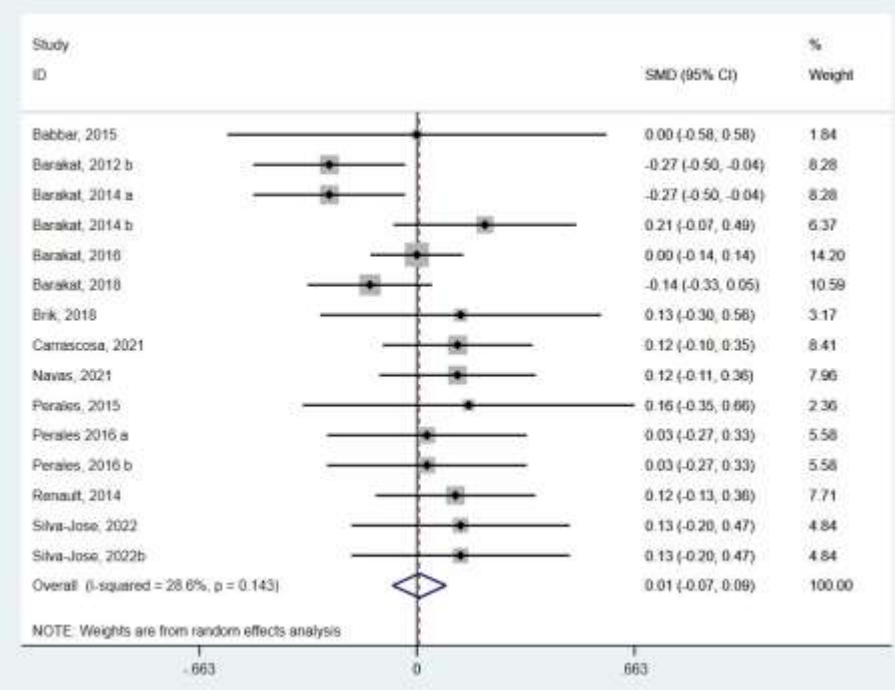
RESULTS:

Ph cord blood

Study	SMD	[95% Conf.	Interval]	% Weight
Babbar, 2015	0.000	-0.578	0.578	1.84
Barakat, 2012 b	-0.267	-0.498	-0.035	8.28
Barakat, 2014 a	-0.267	-0.498	-0.035	8.28
Barakat, 2014 b	0.207	-0.072	0.486	6.37
Barakat, 2016	0.000	-0.142	0.142	14.20
Barakat, 2018	-0.143	-0.333	0.047	10.59
Brik, 2018	0.133	-0.295	0.562	3.17
Carrascosa, 2021	0.124	-0.105	0.353	8.41
Navas, 2021	0.124	-0.115	0.362	7.96
Perales, 2015	0.157	-0.348	0.663	2.36
Perales 2016 a	0.031	-0.274	0.335	5.58
Perales, 2016 b	0.031	-0.274	0.335	5.58
Renault, 2014	0.118	-0.126	0.362	7.71
Silva-Jose, 2022	0.133	-0.200	0.466	4.84
Silva-Jose, 2022b	0.133	-0.200	0.466	4.84
D+L pooled SMD	0.007	-0.074	0.089	100.00

Heterogeneity chi-squared = **19.61** (d.f. = **14**) p = **0.143**
I-squared (variation in SMD attributable to heterogeneity) = **28.6%**
Estimate of between-study variance Tau-squared = **0.0070**

Test of SMD=0 : z= **0.18** p = **0.859**

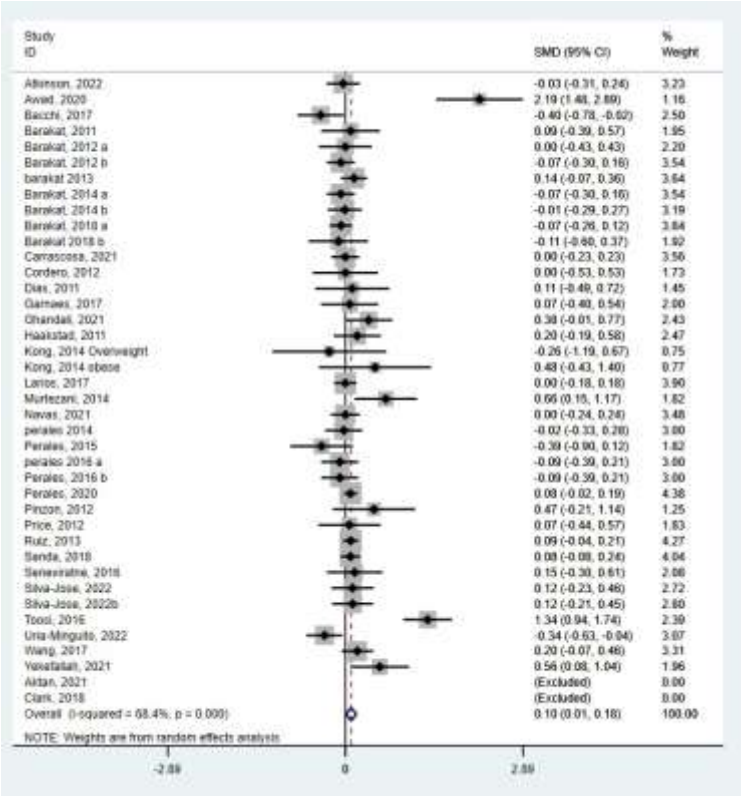


Apgar 1:

Study	SMD	[95% Conf.	Interval]	% Weight
Atkinson, 2022	-0.035	-0.307	0.237	3.23
Awad, 2020	2.187	1.481	2.894	1.16
Bacchi, 2017	-0.402	-0.780	-0.023	2.50
Barakat, 2011	0.087	-0.392	0.566	1.95
Barakat, 2012 a	0.000	-0.431	0.431	2.20
Barakat, 2012 b	-0.074	-0.305	0.156	3.54
barakat 2013	0.143	-0.075	0.360	3.64
Barakat, 2014 a	-0.074	-0.305	0.156	3.54
Barakat, 2014 b	-0.007	-0.285	0.271	3.19
Barakat, 2018 a	-0.070	-0.260	0.119	3.84
Barakat 2018 b	-0.113	-0.599	0.374	1.92
Carrascosa, 2021	0.000	-0.229	0.229	3.56
Cordero, 2012	0.000	-0.531	0.531	1.73
Dias, 2011	0.112	-0.493	0.717	1.45
Garnaes, 2017	0.070	-0.399	0.539	2.00
Ghandali, 2021	0.379	-0.010	0.769	2.43
Haakstad, 2011	0.196	-0.188	0.579	2.47
Kong, 2014 Overweigh	-0.261	-1.190	0.667	0.75
Kong, 2014 obese	0.483	-0.432	1.399	0.77
Larios, 2017	0.000	-0.182	0.182	3.90
Murtezani, 2014	0.660	0.152	1.168	1.82
Navas, 2021	0.000	-0.238	0.238	3.48
perales 2014	-0.024	-0.328	0.281	3.00
Perales, 2015	-0.386	-0.896	0.123	1.82
perales 2016 a	-0.089	-0.394	0.215	3.00
Perales, 2016 b	-0.089	-0.394	0.215	3.00
Perales, 2020	0.083	-0.024	0.190	4.38
Pinzon, 2012	0.466	-0.206	1.139	1.25
Price, 2012	0.067	-0.439	0.573	1.83
Ruiz, 2013	0.087	-0.040	0.213	4.27
Sanda, 2018	0.083	-0.079	0.245	4.04
Senaviratne, 2016	0.152	-0.302	0.605	2.08
Silva-Jose, 2022	0.117	-0.228	0.462	2.72
Silva-Jose, 2022b	0.119	-0.214	0.451	2.80
Toosi, 2016	1.342	0.945	1.738	2.39
Uria-Minguito, 2022	-0.339	-0.633	-0.045	3.07
Wang, 2017	0.196	-0.065	0.457	3.31
Yekefallah, 2021	0.562	0.084	1.040	1.96
Aktan, 2021	(Excluded)			
Clark, 2018	(Excluded)			
D+L pooled SMD	0.095	0.007	0.183	100.00

Heterogeneity chi-squared = **117.25** (d.f. = **37**) p = **0.000**
I-squared (variation in SMD attributable to heterogeneity) = **68.4%**
Estimate of between-study variance Tau-squared = **0.0428**

Test of SMD=0 : z= **2.13** p = **0.033**



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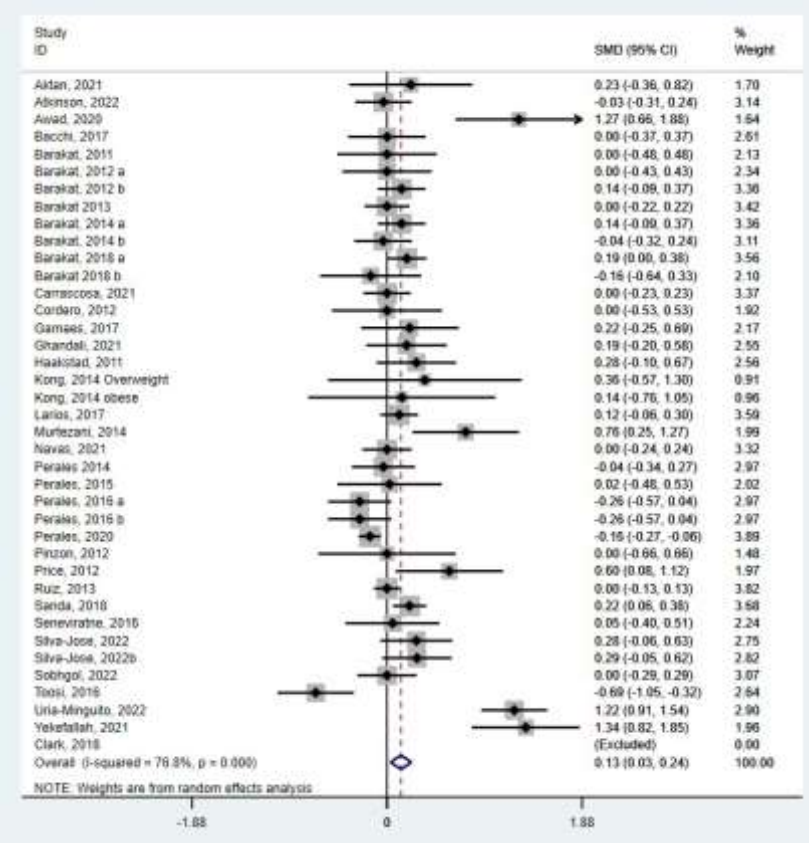
Study
ID
SMD (95% CI)
% Weight
Aldan, 2021 0.23 (-0.36, 0.82) 1.70
Atkinson, 2022 -0.03 (-0.31, 0.24) 3.14
Awad, 2020 1.27 (0.66, 1.88) 1.64
Bacchi, 2017 0.00 (-0.37, 0.37) 2.61
Barakat, 2011 0.00 (-0.48, 0.48) 2.13
Barakat, 2012 a 0.00 (-0.43, 0.43) 2.34
Barakat, 2012 b 0.14 (-0.09, 0.37) 3.36
Barakat 2013 0.00 (-0.22, 0.22) 3.42
Barakat, 2014 a 0.14 (-0.09, 0.37) 3.36
Barakat, 2014 b -0.04 (-0.32, 0.24) 3.11
Barakat, 2018 a 0.19 (0.00, 0.38) 3.56
Barakat 2018 b -0.16 (-0.64, 0.33) 2.10
Carrascosa, 2021 0.00 (-0.23, 0.23) 3.37
Cordaro, 2012 0.00 (-0.53, 0.53) 1.92
Gamaes, 2017 0.22 (-0.25, 0.69) 2.17
Ghandali, 2021 0.19 (-0.20, 0.58) 2.55
Haakstad, 2011 0.28 (-0.10, 0.67) 2.56
Kong, 2014 Overweight 0.36 (-0.57, 1.30) 0.91
Kong, 2014 obese 0.14 (-0.76, 1.05) 0.96
Larios, 2017 0.12 (-0.06, 0.30) 3.59
Murtezani, 2014 0.76 (0.25, 1.27) 1.99
Navas, 2021 0.00 (-0.24, 0.24) 3.32
Perales 2014 -0.04 (-0.34, 0.27) 2.97
Perales, 2015 0.02 (-0.48, 0.53) 2.02
Perales, 2016 a -0.26 (-0.57, 0.04) 2.97
Perales, 2016 b -0.26 (-0.57, 0.04) 2.97
Perales, 2020 -0.15 (-0.27, -0.06) 3.89
Pinzon, 2012 0.00 (-0.66, 0.66) 1.48
Price, 2012 0.60 (0.08, 1.12) 1.97
Ruiz, 2013 0.00 (-0.13, 0.13) 3.82
Sanda, 2018 0.22 (0.06, 0.38) 3.68
Senevirathe, 2016 0.05 (-0.40, 0.51) 2.24
Silva-Jose, 2022 0.28 (-0.06, 0.63) 2.75
Silva-Jose, 2022b 0.29 (-0.05, 0.62) 2.82
Sobhgol, 2022 0.00 (-0.29, 0.29) 3.07
Tiosi, 2016 -0.69 (-1.05, -0.32) 2.64
Uria-Minguito, 2022 1.22 (0.91, 1.54) 2.90
Yekefallah, 2021 1.34 (0.82, 1.85) 1.96
Clark, 2018 (Excluded) 0.00
Overall (I-squared = 76.8%, p = 0.000) 0.13 (0.03, 0.24) 100.00
NOTE: Weights are from random effects analysis
-1.88
0
1.88

Study	SMD	[95% Conf.	Interval]	% Weight
Aktan, 2021	0.230	-0.363	0.823	1.70
Atkinson, 2022	-0.035	-0.307	0.237	3.14
Awad, 2020	1.269	0.659	1.878	1.64
Bacchi, 2017	0.000	-0.375	0.375	2.61
Barakat, 2011	0.000	-0.479	0.479	2.13
Barakat, 2012 a	0.000	-0.431	0.431	2.34
Barakat, 2012 b	0.140	-0.090	0.371	3.36
Barakat 2013	0.000	-0.217	0.217	3.42
Barakat, 2014 a	0.140	-0.090	0.371	3.36
Barakat, 2014 b	-0.037	-0.315	0.240	3.11
Barakat, 2018 a	0.191	0.001	0.381	3.56
Barakat 2018 b	-0.157	-0.644	0.330	2.10
Carrascosa, 2021	0.000	-0.229	0.229	3.37
Cordero, 2012	0.000	-0.531	0.531	1.92
Garnaes, 2017	0.220	-0.250	0.690	2.17
Ghandali, 2021	0.188	-0.199	0.576	2.55
Haakstad, 2011	0.282	-0.102	0.667	2.56
Kong, 2014 Overweigh	0.364	-0.569	1.296	0.91
Kong, 2014 obese	0.143	-0.758	1.045	0.96
Larios, 2017	0.118	-0.064	0.301	3.59
Murtezani, 2014	0.758	0.245	1.270	1.99
Navas, 2021	0.000	-0.238	0.238	3.32
Perales 2014	-0.035	-0.339	0.269	2.97
Perales, 2015	0.025	-0.480	0.530	2.02
Perales, 2016 a	-0.263	-0.568	0.043	2.97
Perales, 2016 b	-0.263	-0.568	0.043	2.97
Perales, 2020	-0.165	-0.272	-0.058	3.89
Pinzon, 2012	0.000	-0.663	0.663	1.48
Price, 2012	0.600	0.082	1.118	1.97
Ruiz, 2013	0.000	-0.126	0.126	3.82
Sanda, 2018	0.217	0.055	0.379	3.68
Seneviratne, 2016	0.052	-0.400	0.505	2.24
Silva-Jose, 2022	0.282	-0.065	0.629	2.75
Silva-Jose, 2022b	0.289	-0.046	0.623	2.82
Sobhgol, 2022	0.000	-0.285	0.285	3.07
Toosi, 2016	-0.686	-1.054	-0.318	2.64
Uria-Minguito, 2022	1.225	0.906	1.543	2.90
Yekefallah, 2021	1.335	0.816	1.855	1.96
Clark, 2018	(Excluded)			
D+L pooled SMD	0.134	0.033	0.236	100.00

Heterogeneity chi-squared = 159.54 (d.f. = 37) p = 0.000
I-squared (variation in SMD attributable to heterogeneity) = 76.8%
Estimate of between-study variance Tau-squared = 0.0658

Test of SMD=0 : z= 2.60 p = 0.009

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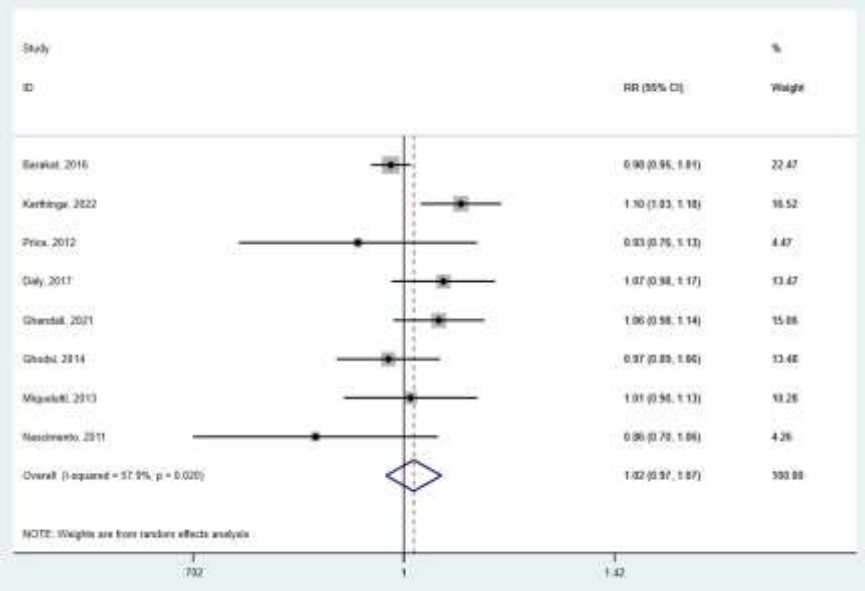

Study	RR	[95% Conf.	Interval]	% Weight
Barakat, 2016	**0.978**	**0.946**	**1.011**	**22.47**
Karthinga, 2022	**1.100**	**1.028**	**1.177**	**16.52**
Price, 2012	**0.926**	**0.758**	**1.130**	**4.47**
Daly, 2017	**1.068**	**0.980**	**1.165**	**13.47**
Ghandali, 2021	**1.060**	**0.982**	**1.145**	**15.06**
Ghodsi, 2014	**0.974**	**0.893**	**1.063**	**13.48**
Miquelutti, 2013	**1.011**	**0.904**	**1.131**	**10.28**
Nascimento, 2011	**0.862**	**0.702**	**1.059**	**4.26**
D+L pooled RR	**1.017**	**0.971**	**1.065**	**100.00**

Heterogeneity chi-squared = **16.63** (d.f. = **7**) p = **0.020**
I-squared (variation in RR attributable to heterogeneity) = **57.9%**
Estimate of between-study variance Tau-squared = **0.0022**

Test of RR=1 : z= **0.70** p = **0.486**

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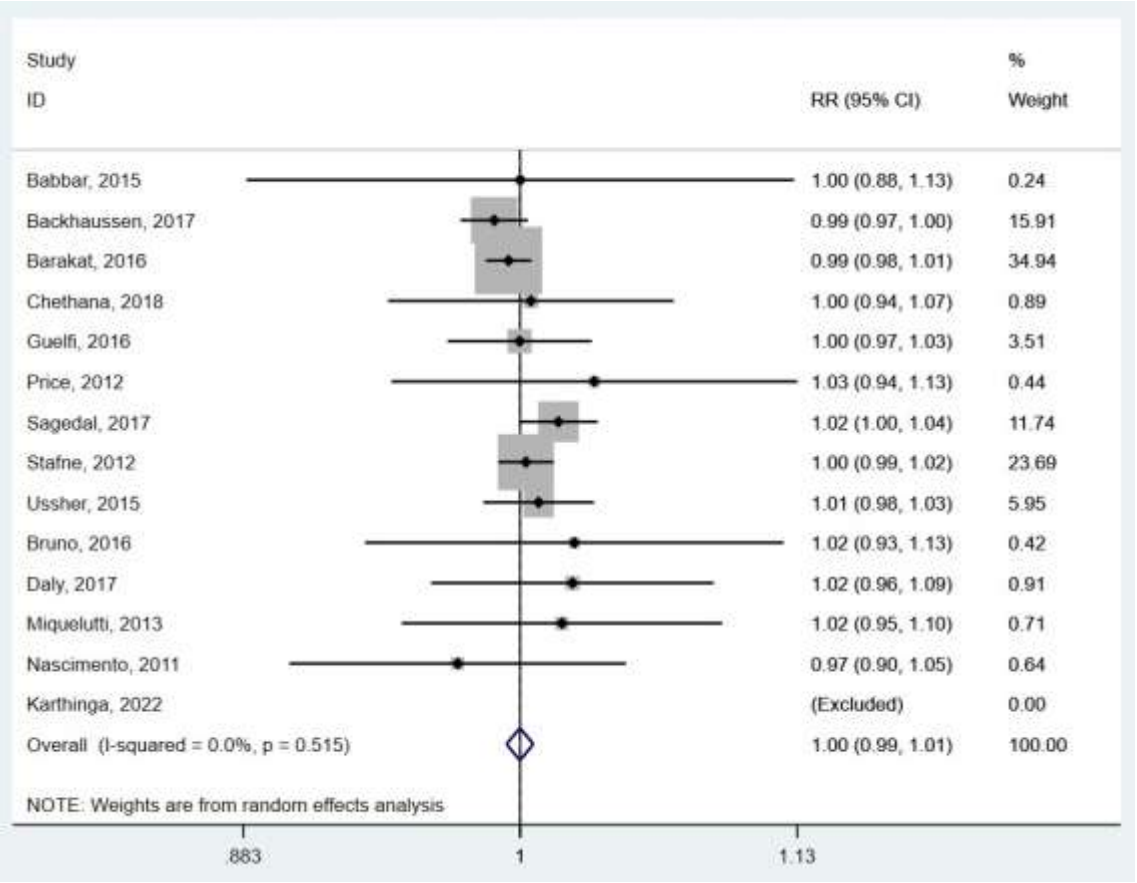
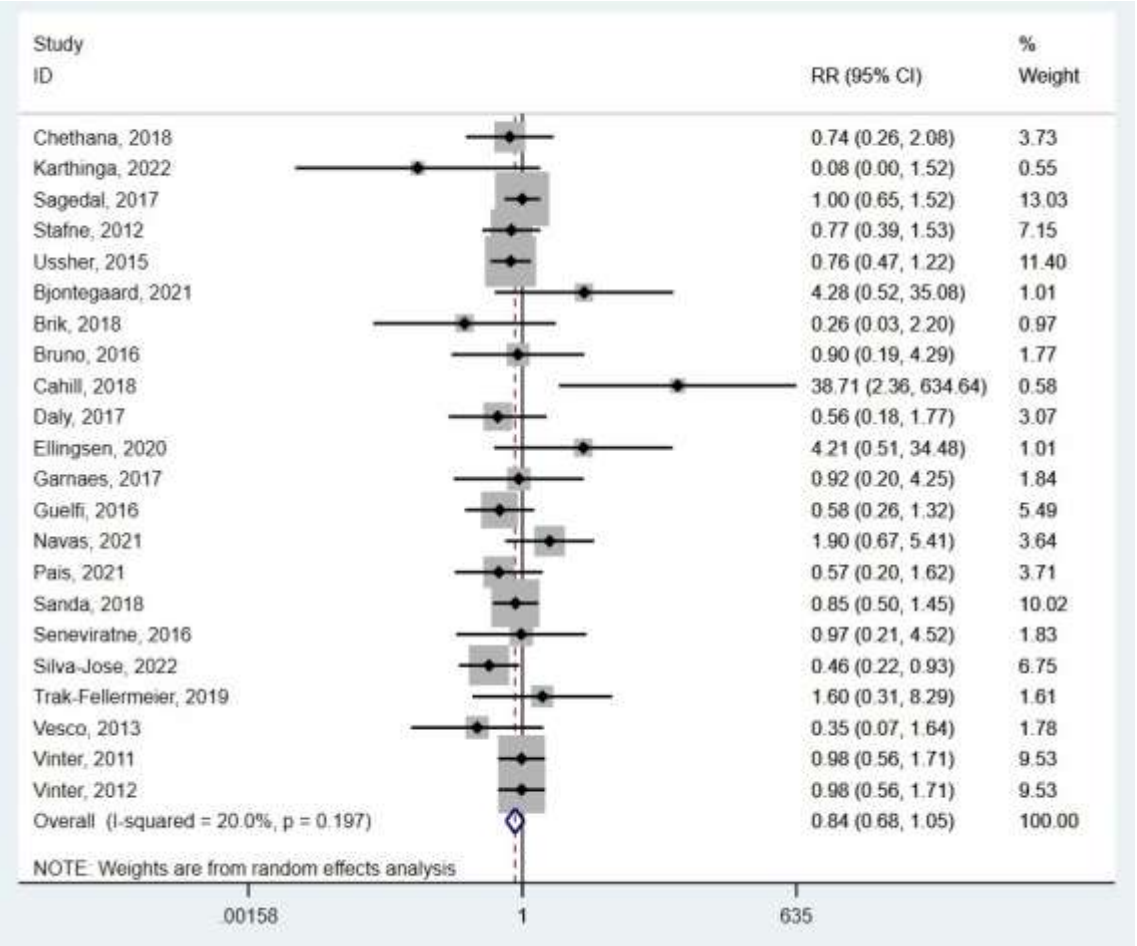


Study	RR	[95% Conf.	Interval]	% Weight
Babbar, 2015	**1.000**	**0.884**	**1.131**	**0.24**
Backhaussen, 2017	**0.988**	**0.973**	**1.004**	**15.91**
Barakat, 2016	**0.995**	**0.985**	**1.005**	**34.94**
Chethana, 2018	**1.005**	**0.942**	**1.071**	**0.89**
Guelfi, 2016	**1.000**	**0.968**	**1.033**	**3.51**
Price, 2012	**1.034**	**0.944**	**1.133**	**0.44**
Sagedal, 2017	**1.017**	**0.999**	**1.036**	**11.74**
Stafne, 2012	**1.003**	**0.990**	**1.015**	**23.69**
Ussher, 2015	**1.008**	**0.984**	**1.034**	**5.95**
Bruno, 2016	**1.025**	**0.933**	**1.126**	**0.42**
Daly, 2017	**1.024**	**0.961**	**1.091**	**0.91**
Miquelutti, 2013	**1.019**	**0.948**	**1.095**	**0.71**
Nascimento, 2011	**0.972**	**0.901**	**1.049**	**0.64**
Karthinga, 2022	(Excluded)			
D+L pooled RR	**1.000**	**0.994**	**1.006**	**100.00**

Heterogeneity chi-squared = **11.16** (d.f. = **12**) p = **0.515**
I-squared (variation in RR attributable to heterogeneity) = **0.0%**
Estimate of between-study variance Tau-squared = **0.0000**

Test of RR=1 : z= **0.04** p = **0.969**

NICU

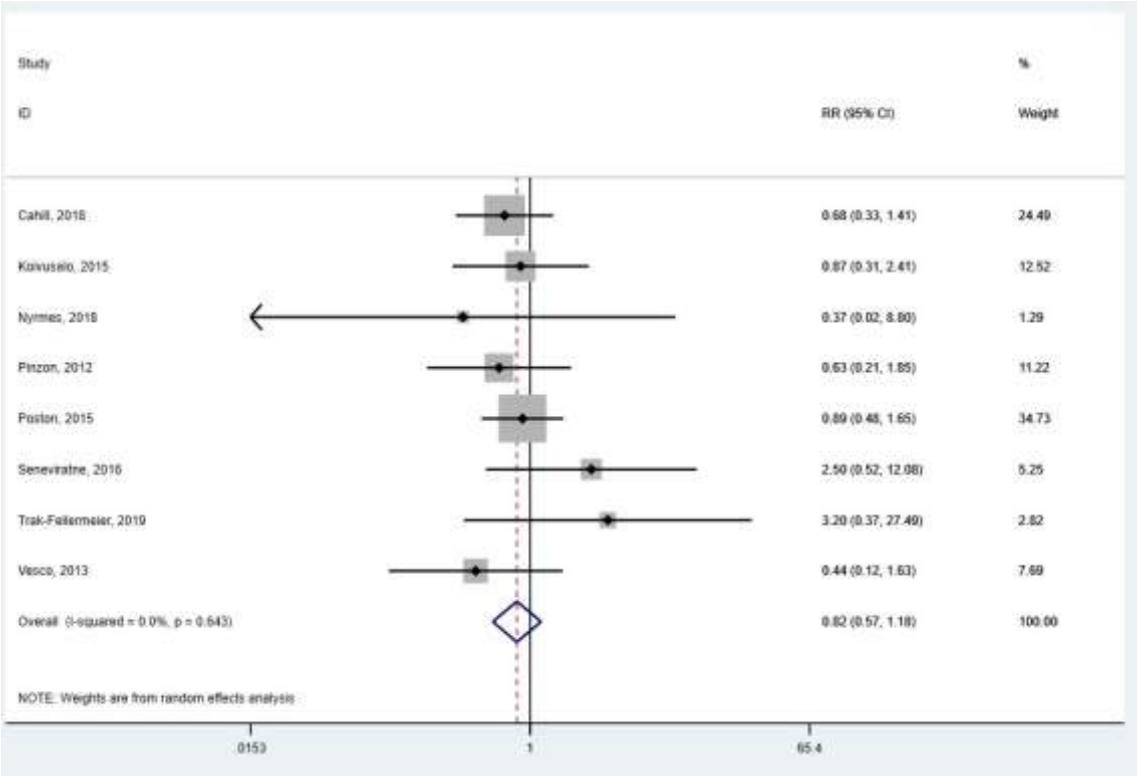


Study	RR	[95% Conf.	Interval]	% Weight
Chethana, 2018	0.742	0.264	2.083	3.73
Karthinga, 2022	0.085	0.005	1.519	0.55
Sagedal, 2017	0.997	0.655	1.516	13.03
Stafne, 2012	0.770	0.388	1.529	7.15
Ussher, 2015	0.759	0.471	1.222	11.40
Bjontegaard, 2021	4.280	0.522	35.084	1.01
Brik, 2018	0.256	0.030	2.197	0.97
Bruno, 2016	0.899	0.188	4.289	1.77
Cahill, 2018	38.711	2.361	634.636	0.58
Daly, 2017	0.558	0.176	1.771	3.07
Ellingsen, 2020	4.207	0.513	34.479	1.01
Garnaes, 2017	0.919	0.199	4.248	1.84
Guelfi, 2016	0.585	0.259	1.322	5.49
Navas, 2021	1.899	0.667	5.410	3.64
Pais, 2021	0.574	0.204	1.615	3.71
Sanda, 2018	0.849	0.499	1.445	10.02
Seneviratne, 2016	0.974	0.210	4.519	1.83
Silva-Jose, 2022	0.457	0.224	0.931	6.75
Trak-Fellermeier, 20	1.600	0.309	8.287	1.61
Vesco, 2013	0.345	0.073	1.639	1.78
Vinter, 2011	0.980	0.563	1.706	9.53
Vinter, 2012	0.980	0.563	1.706	9.53
D+L pooled RR	0.843	0.679	1.045	100.00

Heterogeneity chi-squared = **26.25** (d.f. = **21**) p = **0.197**
I-squared (variation in RR attributable to heterogeneity) = **20.0%**
Estimate of between-study variance Tau-squared = **0.0469**

Test of RR=1 : z= **1.56** p = **0.120**

Respiratory distress

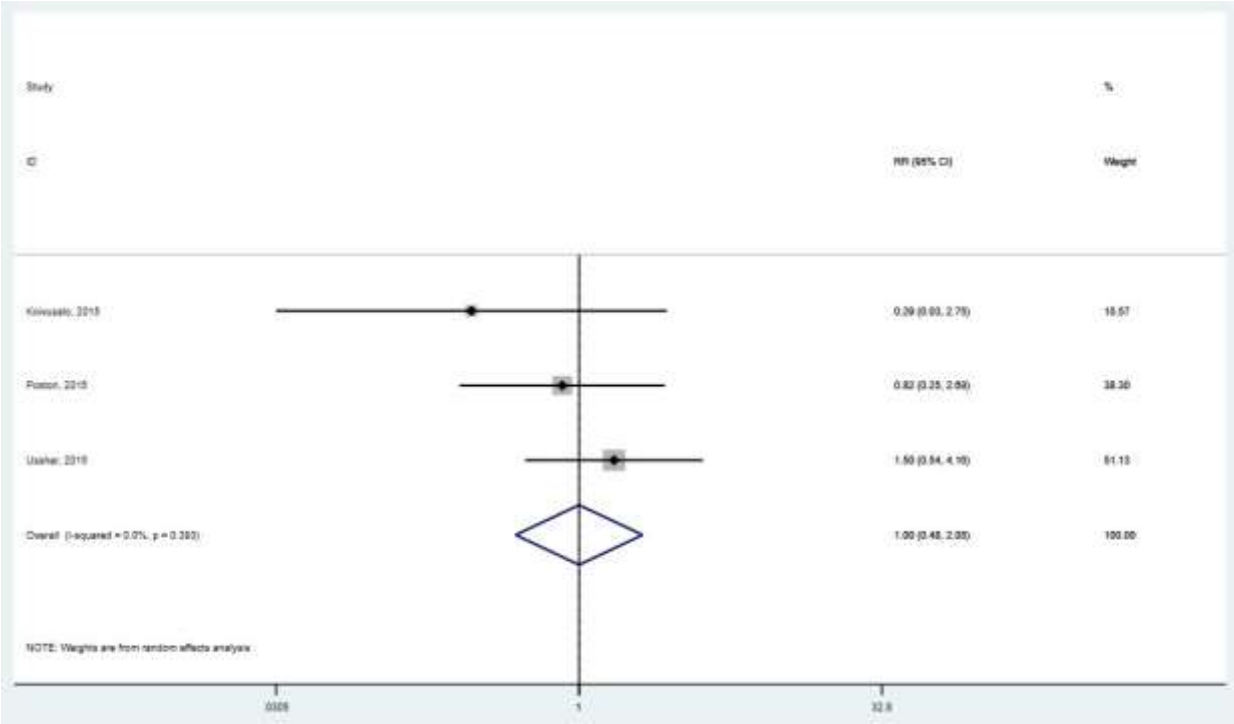


Study	RR	[95% Conf.	Interval]	% Weight
Cahill, 2018	**0.682**	**0.329**	**1.415**	**24.49**
Koivusalo, 2015	**0.868**	**0.313**	**2.407**	**12.52**
Nyrmes, 2018	**0.367**	**0.015**	**8.796**	**1.29**
Pinzon, 2012	**0.630**	**0.214**	**1.850**	**11.22**
Poston, 2015	**0.894**	**0.485**	**1.649**	**34.73**
Seneviratne, 2016	**2.500**	**0.517**	**12.080**	**5.25**
Trak-Fellermeier, 20	**3.200**	**0.372**	**27.492**	**2.82**
Vesco, 2013	**0.444**	**0.121**	**1.631**	**7.69**
D+L pooled RR	**0.821**	**0.573**	**1.179**	**100.00**

Heterogeneity chi-squared = **5.14** (d.f. = **7**) p = **0.643**
I-squared (variation in RR attributable to heterogeneity) = **0.0%**
Estimate of between-study variance Tau-squared = **0.0000**

Test of RR=1 : z= **1.07** p = **0.286**

Congenital malformations



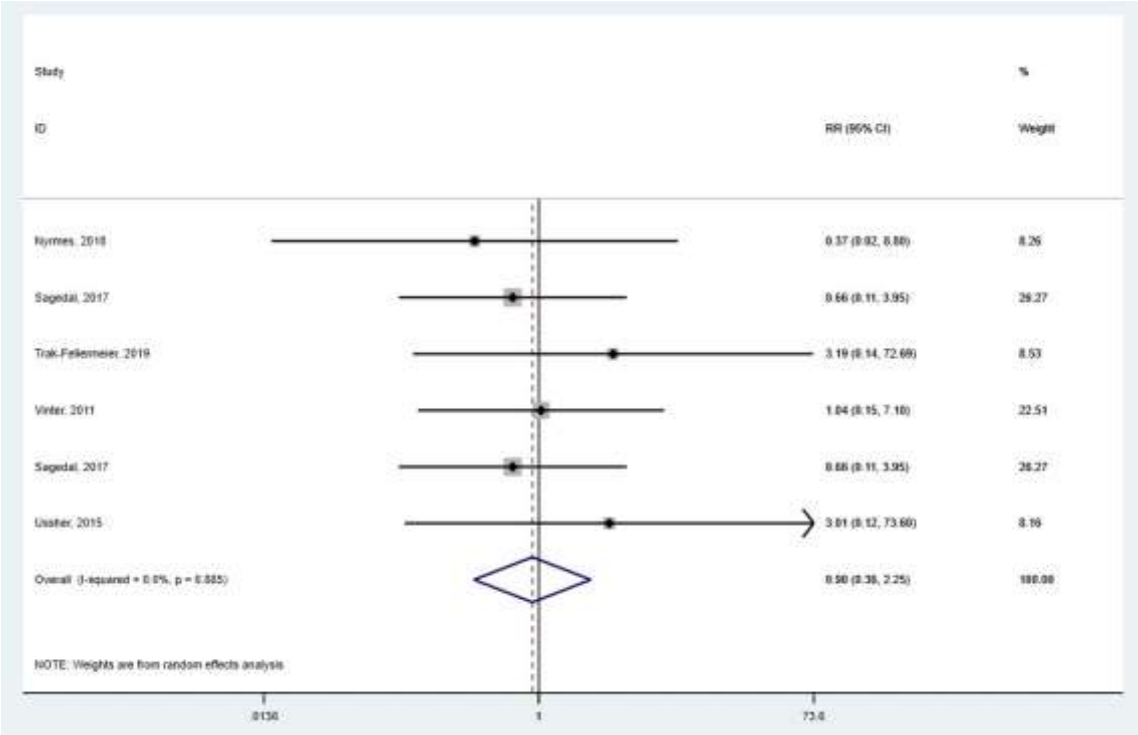
Study	RR	[95% Conf.	Interval]	% Weight
Koivusalo, 2015	**0.289**	**0.030**	**2.747**	**10.57**
Poston, 2015	**0.823**	**0.252**	**2.687**	**38.30**
Ussher, 2015	**1.496**	**0.538**	**4.164**	**51.13**
D+L pooled RR	**1.000**	**0.481**	**2.080**	**100.00**

Heterogeneity chi-squared = **1.87** (d.f. = **2**) p = **0.393**
I-squared (variation in RR attributable to heterogeneity) = **0.0%**
Estimate of between-study variance Tau-squared = **0.0000**

Test of RR=1 : z= **0.00** p = **0.999**

Birth Trauma

Evaluación de certeza							Resumen de los resultados					
Nº de estudios	Diseño de estudio	Riesgo de sesgo	Inconsistencia	Evidencia indirecta	Imprecisión	Otras consideraciones	Nº de pacientes		Efecto		Certeza	Importancia
							Actividad física	Cuidados habituales	Relativo (95% CI)	Absoluto (95% CI)		
Complicaciones neonatales												
41	ensayos aleatorios	no es serio	no es serio	no es serio	no es serio	fuerte asociación	4225	4070	-	0 (0 a 0)	⨁⨁⨁⨁ Alta	CRÍTICO



Study	RR	[95% Conf.	Interval]	% Weight
Nyrmes, 2018	**0.367**	**0.015**	**8.796**	**8.26**
Sagedal, 2017	**0.664**	**0.112**	**3.947**	**26.27**
Trak-Fellermeier, 20	**3.188**	**0.140**	**72.689**	**8.53**
Vinter, 2011	**1.036**	**0.151**	**7.102**	**22.51**
Sagedal, 2017	**0.664**	**0.112**	**3.947**	**26.27**
Ussher, 2015	**3.008**	**0.123**	**73.605**	**8.16**
D+L pooled RR	**0.904**	**0.363**	**2.253**	**100.00**

Heterogeneity chi-squared = **1.73** (d.f. = **5**) p = **0.885**
I-squared (variation in RR attributable to heterogeneity) = **0.0%**
Estimate of between-study variance Tau-squared = **0.0000**

Test of RR=1 : z= **0.22** p = **0.828**

ESTRUCTURA DE LAS RECOMENDACIONES

CALIDAD DE LAS EVIDENCIAS

La calidad de la evidencia científica que sustenta cada recomendación fue calificada en cuatro niveles: muy baja/baja/moderada/alta, según estos criterios:

I. **Alta:** El equipo de trabajo confía plenamente en que los efectos estimados del ejercicio físico en el bienestar materno-fetal son cercanos a los reales.
II. **Moderada**: El equipo de trabajo confía moderadamente en los efectos positivos de la actividad física en los resultados del embarazo. Es probable que la estimación del efecto sea cercana al efecto real.
III. **Muy baja:** el equipo de trabajo estima una mejora de la salud muy poco probable en el seguimiento de la recomendación.
IV. **Baja:** el efecto de la aplicación de la recomendación en la salud de la mujer gestante es valorada como muy limitado por parte del equipo de trabajo.

STRUCTURE OF THE RECOMMENDATIONS

QUALITY OF THE EVIDENCE

The quality of the evidence refers to the level of confidence in the evidence and ranges from very low to high.

I. **High quality:** The Guideline Consensus Panel is very confident that the estimated effect of physical activity on the health outcome is close to the true effect.
II. **Moderate quality:** The Guidelines Consensus Panel is moderately confident in the estimated effect of physical activity on the health outcome; the estimate of the effect is likely to be close to the true effect, but there is a possibility that it is substantially different.
III. **Low quality:** The Guidelines Consensus Panel's confidence in the estimated effect of physical activity on the health outcome is limited; the estimate of the effect may be substantially different from the true effect.

IV. **Very low quality**: The Guidelines Consensus Panel has very little confidence in the estimated effect of physical activity on the health outcome; the estimate of the effect is likely to be substantially different from the true effect.

GRADO DE LAS RECOMENDACIONES

La herramienta utilizada para la valoración de las recomendaciones fue la guía GRADE (*Grading of Recommendations Assessment, Development and Evaluation*), los criterios implementados para determinar si una recomendación es fuerte o débil son:

a) ¿El problema constituye una **prioridad**?
b) ¿Cuál es la magnitud de los **efectos deseables**?
c) ¿Cuál es la magnitud de los **efectos indeseables**?
d) ¿Cuál es la **certeza** (calidad o confianza) del cuerpo de evidencia disponible sobre **los efectos de las intervenciones**?
e) ¿Existe incertidumbre o variabilidad en cómo los pacientes valoran los **desenlaces** de interés?
f) El **balance** entre los efectos deseados e indeseados, ¿favorece a la intervención o a la comparación?
g) ¿Cuál es la magnitud de los **requerimientos de recursos** (costes)?
h) ¿Cuál es la **calidad de la evidencia** sobre los requerimientos de **recursos** (costes)?
i) La relación **coste-efectividad**, ¿favorece a la intervención o a la comparación?
j) ¿Cuál sería el impacto sobre la **equidad**?
k) ¿Es **aceptable** la intervención para los grupos de interés clave?
l) ¿Es **factible** implementar la intervención?

Como decimos esta valoración determina que una recomendación pueda ser considerada:

Fuerte: todas las mujeres gestantes pueden beneficiarse de la recomendación.

Débil: pueden existir ciertas circunstancias que obliguen a la mujer gestante a consultar con el profesional médico antes de acogerse a la recomendación.

STRENGTH OF THE RECOMMENDATIONS

The Grading of Recommendations Assessment, Development and Evaluation (GRADE) system was used to grade the strength of the recommendations.

Recommendations are rated as strong or weak based on:

a) Is the problem a priority?
b) What is the magnitude of the desirable effects?
c) What is the magnitude of the undesirable effects?
d) What is the certainty (quality or confidence) of the available evidence on the effects of the interventions?
e) Is there uncertainty or variability in the assessment of the outcomes of interest?
f) Does the balance between desired and undesired effects favor the intervention or the comparison?
g) What is the magnitude of resource requirements (costs)?
h) What is the quality of the evidence on resource requirements (costs)?
i) Does the cost-effectiveness ratio favor the intervention or the comparison?
j) What is the impact on equity?
k) Is the intervention acceptable to key stakeholders?
l) Is the intervention feasible to implement?

Strong recommendation: Most or all pregnant women will be best served by the recommended course of action.

Weak recommendation: Not all pregnant women will be best served by the recommended course of action; there is a need to consider other factors such as the individual's circumstances, preferences, values, resources available or setting. Consultation with an obstetric care provider may assist in decision-making.

FORMULACIÓN DE LAS RECOMENDACIONES

1) Toda mujer gestante sin contraindicaciones de tipo médicas debería mantenerse activa físicamente durante su embarazo, como un elemento básico y fundamental para el cuidado y mejora de su calidad de vida.
    i Grado de la recomendación:

ii Calidad de la evidencia:

2) La mejor opción es la del ejercicio físico desarrollado dentro de un programa específico para gestantes y supervisado por un profesional, en caso contrario es adecuado contar como mínimo con el asesoramiento del citado profesional.
   i Grado de la recomendación:
   ii Calidad de la evidencia:
3) Las mujeres embarazadas deben acumular al menos 150 minutos semanales de actividad física de intensidad moderada cada semana con el objeto de conseguir beneficios para su salud y al mismo tiempo reducir la posibilidad de complicaciones durante la gestación.
   i Grado de la recomendación:
   ii Calidad de la evidencia:
4) Esta práctica física debe ser desarrollada en (al menos) tres días por semana, aunque es importante un mínimo de actividad diaria.
   i Grado de la recomendación:
   ii Calidad de la evidencia:
5) El tipo de actividades a desarrollar deberían tender a la mejora de la resistencia aeróbica extensiva, la fuerza muscular leve, el equilibrio y la coordinación motriz y la flexibilidad.
   i Grado de la recomendación:
   ii Calidad de la evidencia:
6) Debe desarrollarse durante el embarazo un entrenamiento de los músculos del suelo pélvico para reducir el riesgo de complicaciones en esa zona.
   i Grado de la recomendación:
   ii Calidad de la evidencia:
7) Aquellas gestantes que presenten mareos, náuseas o taquicardia durante el ejercicio en decúbito supino, deben evitar esta posición de trabajo.
   i Grado de la recomendación:
   ii Calidad de la evidencia:
8) Dada la gran cantidad de complicaciones de todo tipo que genera el reposo absoluto en mujeres gestantes, confirmadas científicamente, la importante cantidad de mujeres embarazadas que se encuentren en esta situación deben mantener un mínimo nivel de actividad física diaria, ello con el objeto de evitar las complicaciones asociadas a la inactividad física. Ante la escasa evidencia

existente a favor de una intervención, el GEG presenta esta recomendación en el contexto de investigación y llama la atención acerca de la necesidad urgente de desarrollar estudios de experimentales en este ámbito.

i Grado de la recomendación:
ii Calidad de la evidencia:

FORMULATION OF RECOMMENDATIONS

1) Any pregnant woman without medical contraindications should remain physically active during her pregnancy, in order to promote and improve her quality of life.

    i Strength of the recommendation:
    ii Quality of the evidence:

2) The best option is physical exercise developed within a specific program for the pregnant woman and supervised by a professional; otherwise, it is appropriate to have at least the advice of the aforementioned professional.
    i. Strength of the recommendation:
    ii. Quality of the evidence:
3) Pregnant women should accumulate at least 150 minutes of moderate intensity physical activity per week every week to achieve health benefits and, at the same time, reduce the possibility of complications during pregnancy.
    i. Strength of the recommendation:
    ii. Quality of the evidence:
4) This physical practice should be developed on (at least) three days per week, although a minimum of daily activity is important.
    i. Strength of the recommendation:
    ii. Quality of the evidence:
5) The type of activities to be developed should tend to improve aerobic endurance, mild muscle strength, balance and motor coordination, flexibility.
    i. Strength of the recommendation:
    ii. Quality of the evidence:
6) Pelvic floor muscle training should be developed during pregnancy to reduce the risk of urinary incontinence.

7) Pregnant women who present with dizziness, nausea or tachycardia during exercise in the supine position should avoid this work position.
    i. Strength of the recommendation:
    ii. Quality of the evidence:
8) An important body of scientific literature confirms the large number of different complications generated by bed-rest throughout pregnancy, the significant number of pregnant women in this situation should maintain a minimum level of daily physical activity in order to avoid the complications associated with physical inactivity. Given the scarce evidence in favor of an intervention, the GEG presents this recommendation in the context of research and draws attention to the urgent need to develop experimental studies in this area.
    i. Strength of the recommendation:
    ii. Quality of the evidence:

CONTRAINDICACIONES

Como decíamos previamente, todas aquellas mujeres gestantes que NO presenten contraindicaciones médicas, deben mantener un embarazo físicamente activo. En el caso de contraindicaciones absolutas el ejercicio físico está contraindicado, mientras si una mujer presenta alguna contraindicación relativa, debe ser el profesional sanitario adecuadamente formado quién valore el posible riesgo/beneficio del ejercicio físico en cualquiera de sus formas, duración, frecuencia e intensidad (3).

Contraindicaciones Absolutas:

- Ruptura prematura de membranas
- Amenaza de parto prematuro en gestación actual
- Antecedentes de parto prematuro
- Placenta previa después de la semana 20 de gestación
- Preeclampsia
- Cérvix incompetente
- Crecimiento intrauterino retardado
- Embarazo múltiple
- Diabetes tipo I no controlada.
- Hipertensión no controlada.

- Enfermedad tiroidea no controlada.
- Otros trastornos graves de tipo cardiovascular, respiratorio o similar.

Contraindicaciones Relativas:

- Pérdidas recurrentes de embarazos previos.
- Hipertensión gestacional con adecuado control médico.
- Enfermedades cardiovasculares o respiratorias leves/moderadas.
- Anemia sintomática.
- Desnutrición.
- Trastornos alimentarios.
- Embarazo gemelar después de la semana 28.
- Otras complicaciones médicas significativas.

CONTRAINDICATIONS

As we said previously, all pregnant women who do not present with medical contraindications must maintain a physically active pregnancy. In the case of absolute contraindications, physical exercise is contraindicated, while if a woman has any relative contraindication, a properly trained health professional should evaluate the possible risk/benefit of physical exercise in any of its forms, duration, frequency or intensity (3).

Absolute contraindications:

- Premature rupture of membranes
- Threat of premature birth in current pregnancy
- History of premature delivery
- Placenta previa after week 20 of gestation
- Preeclampsia
- Incompetent cervix
- Delayed intrauterine growth
- Multiple pregnancy
- Uncontrolled type I diabetes
- Uncontrolled hypertension
- Uncontrolled thyroid disease

- Other serious cardiovascular, respiratory or similar disorders

Relative contraindications:

- Recurrent losses of previous pregnancies.
- Gestational hypertension with adequate medical supervision.
- Mild/moderate cardiovascular or respiratory diseases.
- Symptomatic anemia.
- Malnutrition.
- Eating disorders.
- Twin pregnancy after week 28.
- Other significant medical complications.

FACTORES A TENER EN CUENTA y SITUACIONES QUE SE DEBEN EVITAR EN LA PRÁCTICA FÍSICA DURANTE EL EMBARAZO

a) Es importante recordar que el ejercicio físico durante el embarazo debe tener un **carácter regular**, nunca ocasional.
b) Se deben evitar los **ejercicios de tipo hipopresivo** durante todo el proceso de gestación.
c) Se recomienda por norma general no utilizar **actividades de impacto.**
d) Se debe procurar mantener antes y después de la actividad una adecuada **ingesta de líquidos**.
e) Todas aquellas actividades o deportes que potencialmente supongan un **riesgo de caída o traumatismo** deben ser evitadas.
f) En cuanto a las condiciones ambientales de la práctica física, se debe tener especial precaución con las **elevadas temperaturas ambientales o ambientes muy húmedos** con el objeto de evitar cuadros de hipertermia (temperatura corporal superior a 38º C).
g) Se deben evitar actividades que incluyan la **maniobra de Valsalva**, se trata de la acción que impide o dificulta la expulsión de aire al exterior, por medio de un bloqueo de la glotis, o bien a través del mantenimiento de la nariz y la boca cerrada. Se trata en definitiva de un bloqueo respiratorio generado de forma autónoma por la propia persona. Esto naturalmente incrementa la presión intraabdominal, lo que puede resultar perjudicial para la gestante y la perfusión intrauterina.

h) También como regla general y para eliminar riesgos potenciales, se evitarán **movimientos bruscos y posiciones de tensión muscular extrema**.

i) En cuanto al análisis de las **posiciones operativas para el ejercicio físico**, éstas merecen un análisis específico (más abajo) y varios autores se han ocupado de ello. Como norma general se deben descartar aquellas en las que zonas sobrecargadas normalmente por el embarazo se vean aún más perjudicadas. Naturalmente esto nos obliga a descartar el trabajo en decúbito ventral (tendido prono o boca abajo), con respecto a las diferentes posibilidades operativas:

   i. **Bipedestación:** es la posición tradicionalmente más utilizada, resulta válida y eficiente para gran cantidad de ejercicios; sin embargo, es adecuado no abusar de ella durante el embarazo, especialmente en el último trimestre en el cual el crecimiento uterino genera, además de un cambio en el centro de gravedad, ciertas incomodidades y una importante pérdida del equilibrio, lo que provoca entre otras modificaciones una traslación del eje cráneo-caudal de la mujer hacia atrás. Las tareas que no generan una modificación en los apoyos no presentan mayores complicaciones. Sin embargo, se recomienda especial precaución en aquellos ejercicios que, por su desarrollo, ocasionan un cambio en los apoyos (Fig. 3 a, b, c). Se recomienda especial cuidado con las flexiones de piernas (sentadillas), procurando no generar una excesiva flexión de las mismas, así como generar apoyos adicionales (Fig. 4).

   ii. **Sedestación:** posición muy viable y adecuada durante el embarazo, en particular si se realiza sobre una superficie blanda, por ejemplo, fitball (Fig. 5), lo que evita las incomodidades generadas por las modificaciones en la zona genital de la mujer gestante y ofrece una gran cantidad y variedad de posibilidades. Del mismo modo se recomienda la utilización de esta posición con modificaciones y apoyos adicionales (Fig. 5).

   iii. **Cuadrupedia:** posición muy adecuada y aplicable a una gran cantidad de ejercicios, es conveniente no mantener esta posición durante excesivo tiempo y alternar con otra, con el objeto de no sobrecargar la zona cervical de la mujer gestante. En esta posición también se debe tener especial precaución en no ocasionar una hiperflexión de muñeca con el objeto de no disminuir el espacio disponible en el túnel carpiano (Fig. 6).

iv. **Decúbito supino:** se trata de una posición que presenta cierta dificultad debido a la posibilidad de disminución del retorno venoso por la presión del útero grávido sobre la vena cava inferior, especialmente en la etapa final del embarazo, pudiendo ocasionar en algunas gestantes un síndrome supino-hipotensivo o compresión aorto-cava (Fig. 7). Esta hipotética complicación fue la responsable de que, en el pasado, esta posición fuese considerada como no recomendada o evitable.

Sin embargo, para el desarrollo de tareas suaves sin excesiva sobrecarga resulta una posición muy adecuada siempre que su carga de trabajo no se prolongue más allá de 2-3 minutos y se produzca una alternancia con tareas en la posición decúbito lateral, siempre empezando por el lado izquierdo. En este sentido ciertos estudios han demostrado que en gestantes sanas esta carga no representa un riesgo para el citado síndrome supino-hipotensivo. En la misma línea se recomienda la utilización de la posición en decúbito supino modificado en la que el apoyo de la zona lumbar no se ve comprometido (Fig. 8 a, b), lo que en teoría puede disminuir de forma importante el riesgo de síndrome supino-hipotensivo.

v. **Decúbito lateral:** es una posición de trabajo muy adecuada y pertinente durante la gestación, no sólo por la gran cantidad de aplicaciones derivadas de la misma, sino porque como hemos visto, resulta una excelente alternativa para la descompresión de la vena cava inferior y el consiguiente mantenimiento del retorno venoso, lógicamente se recomienda alternar ambos lados iniciando o priorizando siempre la tarea por el lado izquierdo (Fig. 9 a, b).

FACTORS TO TAKE INTO ACCOUNT and SITUATIONS TO AVOID IN PHYSICAL PRACTICE DURING PREGNANCY

j) It is important to remember that physical exercise during pregnancy should be **regular**, never occasional.
k) **Hypopressive exercises** should be avoided during the entire pregnancy process.
l) As a general rule, **high impact activity** is not recommended.
m) Adequate **fluid intake** should be maintained before and after the activity.

n) All activities or sports that potentially pose a **risk of falls or trauma** should be avoided.

o) Regarding the environmental conditions of physical practice, special caution should be taken with **high ambient temperatures or very humid environments** to avoid hyperthermia (body temperature above 38 °C).

p) Activities that include the **Valsalva maneuver** should be avoided, as it is the action that prevents or hinders the expulsion of air to the outside, by means of a blockage of the glottis, or by keeping the nose and mouth closed. It is ultimately a respiratory blockage generated autonomously by the person. This naturally increases intra-abdominal pressure, which can be detrimental to the pregnant woman and cause intrauterine perfusion.

q) As a general rule and to eliminate potential risks, **sudden movements and positions of extreme muscle tension** should be avoided.

r) Regarding **operational positions for physical exercise**, these deserve a specific analysis (below), and several authors have addressed this (24-27). As a general rule, this refers to exercises in which areas normally overloaded by pregnancy are even more affected. Naturally, this forces us to discard work in the prone position (lying prone or face down) with respect to the different operative possibilities:

    i. **Standing:** Standing is traditionally the most used position; it is valid and efficient for a large number of exercises. However, it is appropriate not to overuse this position during pregnancy, especially in the last trimester in which uterine growth occurs, in addition to a change in the center of gravity, certain discomforts and a significant loss of balance, among others, which changes the translation of the cranio–caudal axis of the woman backward. The tasks that do not generate a modification in the supports do not present major complications. However, special caution is recommended in those exercises that, due to their development, cause a change in the supports (Fig. 3 a, b, c). Special care is recommended with leg flexion (squats), trying not to generate excessive leg flexion or generate additional support (Fig. 4).

Figure 3 a, b, c


Figure 4

ii. **Seated:** The seated position is quite viable and adequate during pregnancy, particularly if performed on a soft surface, such as a FitBALL (Fig. 5), which avoids the discomfort generated by modifications in the genital area of the pregnant woman and offers a large number and variety of possibilities. Similarly, the use of this position with modifications and additional support is recommended (Fig. 5a, 5b).

Figure 5 a, b

iii. **Quadrupeds:** The quadruped position is an adequate position and applicable to a large number of exercises; however, it is advisable not to maintain this position for an excessive amount of time and to alternate with another position so as not to overload the cervical area of the pregnant woman. In this position, special care should also be taken not to cause hyperflexion of the wrist to avoid decreasing the space available in the carpal tunnel (Fig. 6).

Figure 6

iv. **Supine decubitus:** This position presents some difficulty due to the possibility of decreased venous return due to the pressure of the gravid uterus on the inferior vena cava, especially in the final stage of pregnancy, which may cause a supine syndrome due to hypotensive or aortocaval compression in some pregnant women. (Fig. 7). This hypothetical complication is the reason this position was not recommended or considered one to avoid in the past.

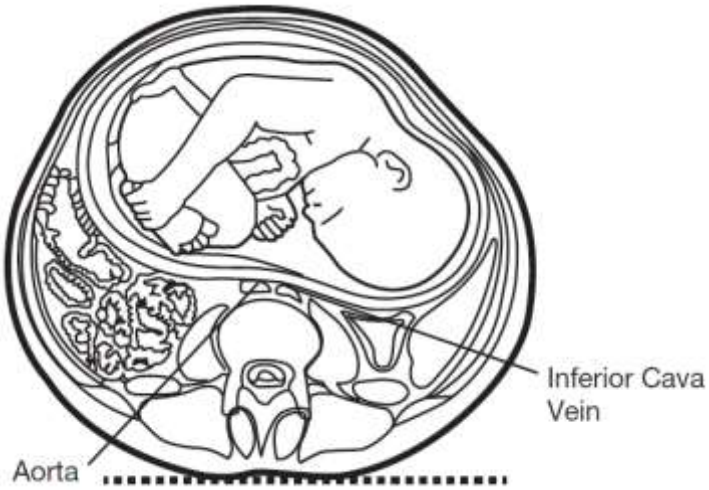


Fig. 7: Compression of the inferior vena cava by the gravid uterus

However, for the development of soft tasks without excessive overload, it is an adequate position as long as the workload does not last longer than 2-3 minutes and there is an alternation between tasks in the lateral decubitus position, always starting on the left side. In this sense, certain studies have shown that in healthy pregnant women, this burden does not represent a risk for the aforementioned supine–hypotensive syndrome. Similarly, the use of the modified supine position, in which the support of the lumbar area is not compromised (Fig. 8a, 8b), is recommended; in theory, this can significantly reduce the risk of supine–hypotensive syndrome.

Figure 8 a, b

vi. **Lateral decubitus:** It is an appropriate and relevant work position during pregnancy, not only because of the large number of applications derived from it but also because, as we have seen, it is an excellent alternative for the decompression of the inferior vena cava and the consequent maintenance of venous return. It is logically recommended to alternate between both sides, always starting or prioritizing the task on the left side (Fig. 9a, 9b).

Figure 9 a, b

GUÍA DE PRÁCTICA CLÍNICA SOBRE LA ACTIVIDAD FÍSICA DURANTE EL EMBARAZO

Propuestas de Proyectos que pueden desarrollarse con la UPM como futuras líneas de investigación

Proposals for projects that can be developed with the UPM as future research lines

Martes 15 de Noviembre

Tuesday November 15th

ABSTRACTS

Como se ha podido observar, un equipo multidisciplinar de trabajo, compuesto por profesionales de las Ciencias de la Actividad Física y del Deporte, junto con profesionales sanitarios (especialmente de la Obstetricia), así como relevantes investigadoras de universidades nacionales y extranjeras; llevaron a cabo en un proceso que se inició en Noviembre de 2021, la elaboración de la *Guía de práctica clínica sobre la actividad física durante el embarazo.*

Como hemos detallado al inicio de este documento, durante el 14 y 15 de Noviembre se desarrollaron las dos Jornadas de resumen de los contenidos de esta Guía, que durante los meses de Diciembre y Enero serán sometidas a una fase de edición, revisión pública y sometimiento final al Sistema Nacional de Salud, dependiente del Ministerio de Sanidad.

El Lunes 14 de Noviembre se trataron aspectos relacionados con cada uno de los contenidos de la Guía, especialmente las preguntas PICO, así como aquellos factores que influyen en la calidad científica y el peso de cada una de las recomendaciones, todos ellos analizados en las páginas previas de este documento.

El Martes 15 de Noviembre la Jornada fue dedicada a las exposiciones de los proyectos y líneas de investigación que, como fruto de la presente Guía pueden ser desarrollados por las instituciones integradas en el equipo de trabajo. Se ofrece a continuación un resumen de cada una de las propuestas presentadas por las investigadoras participantes.

Impact of in-person or online supervised multicenter multicomponent prenatal exercise program on maternal physical activity, fitness, and health: protocol for the Active Pregnancy randomized control trial

Rita Santos Rocha

Exercise during pregnancy provides various benefits. The COVID-19 pandemic has accentuated the need for virtual interaction with participants. It is pertinent to implement effective and safe programs, and to contribute to evidence-based knowledge about the impact of exercise on physical activity, fitness, and health parameters, regardless of maternal age, health status and fitness levels.

Objective: protocol of a prenatal exercise program delivered in-person (IN) and online (ON) to improving maternal physical activity, fitness, and health parameters throughout pregnancy and postpartum.

Methods: multicenter RCT study with two groups. The sample will consist of 300-500 pregnant women, without absolute contraindications, who will be randomly allocated to two 12-weeks supervised multicenter multicomponent exercise groups (IN versus ON). Maternal age subgroups (20-35/35-50 years) will also be under analysis. Data collection: baseline (10-20 gestational weeks), post-intervention, and 3-months postpartum. Primary outcomes: physical activity, health-related, and functional fitness. Secondary outcomes: quality of life and other health parameters. Additional outcomes: evaluation of interventions and resources (ebooks, YouTube channel, app). Assessments: questionnaires, basic equipment field tests, and gait analysis.Comparisons: impact of in-person and online interventions, on primary and secondary outcomes, and in subsamples of age groups.

Expected results: effectiveness of the IN/ON program; recommendations for planning prenatal exercise.

Long-term effects of a prenatal moderate exercise intervention: a 2-year follow up study of a randomized controlled trial.

Dr Maia Brik, Vall d´Hebron Institute of Recerca (VHIR), Barcelona.

Abstract

Introduction: Regular physical exercise during pregnancy is associated with numerous benefits, such as decreased incidence of gestational diabetes, hypertensive disorders, operative deliveries, and excess weight gain and weight retention in the postpartum period and postpartum depression. Nevertheless, the specific long-term effects of a moderate exercise program intervention during pregnancy on the cardiovascular risk, the level of physical activity and the mental health are unknown.

Objective: To analyze the long-term impact of a prenatal moderate exercise intervention on the individual cardiovascular risk, the level of physical activity profile and the mental health.

Methods: Follow-up study of a Multicenter RCT "Active Pregnancy. Mental and Emotional Health Care to Pregnant Woman During and After Coronavirus (COVID-19) (GESTACTIVE)" (NCT05295264). Participants: Eligibility criteria include women who participated in this RCT 1-2 years ago in any of the study centers, and consent to participate.

In a single clinical appointment, participants will have the following assessments:

Cardiovascular assessment: Blood Pressure, Heart Rate, Lipid profile, fasting glucose glycated Hb, Carotid intima media thickness (CIMT) ultrasound. The 10-year risk of heart disease or stroke risk will be calculated using the ASCVD algorithm (2013 ACC/AHA Guideline on the Assessment of Cardiovascular Risk).

Physical activity assessment: Global Physical Activity Questionnaire (GPAQ), and International Physical Activity Questionnaire (IPAQ).

Diet Assessment: Mediterrean Diet Adherence Screener (MEDAS) questionnaire.

Mental Health Assessment: Profile of Mood States (POMS 2-A) questionnaire.

Data collection: REDCap system will be used to collect data. Data protection will be guaranteed. Statistics: SPSS software will be used for data analysis.

Ethics: consent form will be obtained from each participant. IRB approval will be required from each study center.

Porting SmartMoms Canada to Spain: Development and evaluation of SmartMoms Spain

Kristi Adamo

Potential future research endeavour with UPM

Overarching Goal: Will a translated and contextualized Spanish version of the SmartMoms Canada mHealth app be feasible to support adherence to GWG guidelines by helping pregnant individuals adopt healthful behaviours related to nutrition, physical activity, and sleep during pregnancy?

CONTEXT: Pregnancy, a critical period of intervention: Weight gain in pregnancy is an important measurement. Gestational parents who fall outside the Institute of Medicine GWG guidelines place themselves and their children at increased risk of serious health complications. Considering the health and economic impacts of obesity, attenuating rates is a high priority. **The problem:** Our research and others indicate that pregnant individuals report receiving insufficient guidance and often no information on healthy behaviours from their primary health care providers (HCP). Moreover, many HCP lack simple, evidence-based tools to support counselling on healthy weight gain. **The solution:** Today's tech-savvy parents seek personalized support and are receptive to novel approaches, including receiving guidance on prenatal care through their phones. The ease of use and adaptability of mobile technologies provide an excellent opportunity for delivering curated lifestyle intervention programming. The *SmartMoms Canada* mHealth intervention program, currently available in French and English, is well-positioned for translation to other languages. Tethered to WiFi-enabled devices, the mHealth app delivers real-time prenatal weight management and relies on previously developed healthy behaviour guidelines and tools. The proposed *SmartMoms-Spain* app will respond to the clinically important gaps in readily available evidence-based information for gestational parents and the inadequate personalized guidance from HCP.

METHODOLOGY & OUTCOMES: We propose creating and evaluating a *SmartMoms Spain* app using a **feasibility study** designed to assess the viability the mHealth app-based intervention to support pregnant individuals in achieving GWG recommendations. This evaluation would be done by evaluating recruitment and adherence, data collection/outcome measures, and intervention procedures. Benefits of a feasibility study are to i) test the acceptance of *SmartMoms Spain* and set the stage for a successful **future implementation trial**; ii) generate data for sample size calculations for the next phase; iii) estimate proportions for the main outcome (in our case, GWG); and iv) provide viability data on recruitment and adherence rates in Spain.

Comportamientos de movimiento y no movimiento durante las 24 hs del día y su relación con la salud en mujeres embarazadas

De Roia, Gabriela Fernanda- Laboratorio de Estudios en Actividad Física (LEAF) Universidad de Flores (UFLO) , Buenos Aires, Argentina

Resumen

Las personas alternan períodos de movimiento y no movimiento durante las 24hs del día, que pueden agruparse, en tiempo dedicado a actividad física (AF) (i.e intensidad: leve, moderada y vigorosa), comportamiento sedentario (CS) y sueño (S). La contribución del tiempo de cada variable se integra en un patrón de comportamiento de movimiento y no movimiento durante las 24hs (M&nM-24hs) que tiene implicancias en la salud. En gestantes, se ha observado que no realizar AF regular, mantener un CS excesivo y un S inadecuado son factores independientes que afectan de manera negativa la salud durante el embarazo y al momento del parto. Datos internacionales muestran que gran parte de la población gestante no mantiene comportamientos beneficiosos durante el embarazo, sin embargo, la AF, CS y S son variables comportamentales susceptibles de ser modificadas con intervenciones basadas en teorías del cambio de comportamiento. La herramienta de las 5'A es utilizada para impulsar cambios comportamentales en atención primaria de la salud y podría adaptarse al enfoque de M&nM-24hs en población gestante. En este marco, nos proponemos elaborar un modelo de intervención de cambio de comportamiento durante el embarazo desde un enfoque de M&nM-24hs, para aplicar en la consulta obstétrica, en etapas: 1) validar cuestionarios que permitan categorizar el comportamiento y brinden información sobre barreras y facilitadores; 2) Elaborar recomendaciones desde un enfoque de M&nM-24hs; 3) elaborar una herramienta de cambio de comportamiento integrada en M&nM-24hs y valorar el impacto en la salud materno fetal durante el embarazo y al momento del parto.

Palabras clave: tiempo sedentario, actividad física, sueño, mujeres gestantes, comportamiento.

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24hs movement and non- movement behaviors and health during pregnancy

Abstract: Individuals alternate periods of movement and non-movement during the 24hs of the day, which can be grouped into time dedicated to physical activity (PA) (i.e. intensity: light, moderate and vigorous), sedentary behavior (SB) and sleep (S). The time allocation of each of these groups is integrated into a pattern of movement and non-movement behavior during the 24hs (M&nM-24hs) that has proven health implications. In pregnant women, it has been observed that not engaging in regular PA, sustaining excessive SB and inadequate S are independent factors that negatively affect health during pregnancy and at the time of delivery. International data revealed that a large part of the pregnant population does not observe healthy behaviors during pregnancy; however, PA, SB and S are behavioral factors that can be modified with interventions based on theories of behavioral change. The 5'A tool is used to drive behavioral changes in primary health care and could be adapted to the M&nM-24hs approach in the pregnant population. Therefore, we propose to develop a behavior change intervention model during pregnancy from an M&nM-24hs approach, to be applied in obstetric consultation, following these steps: 1) validate questionnaires to categorize behavior and provide information on barriers and facilitators; 2) develop recommendations from an M&nM-24hs approach; 3) develop a behavior change tool integrated in M&nM-24hs and assess the impact on maternal and fetal health during pregnancy and at the time of delivery.

Keywords: Sedentary time, physical activity, sleep, behavior, pregnant women.

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Bed Rest during pregnancy and physical activity

Montse Palacio Riera. Hospital Universitario Clinica de Barcelona.

One third of the pregnant women has prescription of some kind of restriction of her physical activity during pregnancy. In some cases, strict bed rest is indicated for days and weeks. Bed rest has been related to physical and emotional adverse effects in humans while has been barely studied in pregnant women. OBJECTIVE: the aim of our study is to evaluate in pregnant women in bed rest a) the feasability and adherence of an exercise routine specifically designed for bed rest and b) to evaluate de potential benefits to include an exercise routine in such a group of women. METHODS: Hospitalized pregnant women in bed rest after stabilization of her medical condition will be included. Women with indication or potential immediate delivery will be excluded. Markers of cardiovascular deconditioning (muscle and bone) will be measured. Physical fitness and emotional evaluation will be measured at recruitment, during pregnancy and after delivery. Results will be compared with a group of women managed by the standard protocol.

Amenaza de aborto y ejercicio. ¿Necesito estar en reposo todo el embarazo?

Paloma Hernando López. Hospital universitario Puerta de Hierro de Majadahonda

La amenaza de aborto supone un hecho muy frecuente y preocupante en las mujeres embarazadas. Es definida como todo aquel sangrado que se produce durante el primer trimestre de gestación, hasta las 12 semanas. Cuando una mujer es diagnosticada de amenaza de aborto, se le recomienda mantener un reposo relativo. Dicho reposo ya ha sido demostrado que no implica mejores o peores resultados en la gestación, ya que la causa principal de aborto durante el primer trimestre es la alteración cromosómica. Este reposo, en muchas ocasiones, es mantenido por la paciente durante todo el primer trimestre (aunque el sangrado haya cedido) o, incluso, durante todo el embarazo, por miedo a tener más episodios de sangrado. Sería interesante demostrar que mantener una vida activa durante el embarazo (incluyendo el primer trimestre) en las pacientes diagnosticadas de amenaza de aborto, no implica peores resultados obstétricos, o que incluso puede llegar a mejorarlos.

Threatened abortion and exercise. Do I need to be at rest the whole pregnancy?

Threatened abortion is a very frequent and worrying fact in pregnant women. It is defined as all bleeding episode that occurs during the first trimester of pregnancy, up to 12 weeks. When a diagnostic of threatened abortion is made, relative rest is recommended to the pregnant woman. This relative rest has already been shown not to imply better or worse results in pregnancy, since the main cause of abortion during the first trimester is chromosomal disturbance. This rest, many times, is maintained by the patient throughout the first trimester (although the bleeding has stopped) or even throughout the pregnancy, for fear of having more bleeding episodes. It would be interesting to show that maintaining an active life during pregnancy (including the first trimester) in patients diagnosed with threatened abortion does not imply worse obstetric results, or that it may even improve them.

Realización de un programa de ejercicio físico durante la gestación para la prevención de patología del suelo pélvico. Ensayo clínico aleatorizado.

Proyecto UPM- Hospital Universitario de Torrejón

Arantzazu Martín Arias

Introducción:

La patología del suelo pélvico es un problema muy frecuente que afecta a % de las mujeres. El prolapso de los órganos pélvicos (POP) y la incontinencia urinaria (IU) son motivos frecuentes de asistencia a la consulta de ginecología que afectan a la vida de las mujeres y que en muchas ocasiones requieren un tratamiento quirúrgico.

Ambas patologías están asociadas a la paridad, siendo más frecuentes en mujeres que han tenido hijos por vía vaginal y más aún en los casos de partos instrumentales,

Hipótesis:

La realización de un programa de ejercicio físico durante el embarazo y los 6 meses postparto puede disminuir la aparición de patología del suelo pélvico.

Objetivos principal:

- Estudiar cómo afecta el ejercicio físico durante el embarazo y el posparto a la incidencia de patología de suelo pélvico (POP o IU)

Objetivos secundarios:

- Valorar cómo afecta la realización de ejercicio físico durante el embarazo y postparto en las medidas ecográficas del hiato urogenital.
- Estudiar cómo afecta el ejercicio físico en la aparición de lesiones del hiato urogenital tras el parto.

- Estudiar cómo afecta la realización de ejercicio físico durante el embarazo y postparto a la función sexual femenina

Effect of a specific exercise programme during pregnancy on diastasis recti abdominis – a randomized controlled trial

Patricia Mota

ABSTRACT

Introduction: Diastasis recti abdominis (DRA) is a common condition in pregnant and postpartum women. There is weak evidence for the treatment of DRA both during pregnancy and in postpartum period. This condition occurs during the last two trimesters of pregnancy and the prevalence of DRA is still high at 6 months postpartum. Abdominal Hypopressive Exercises have been recommended as a global therapeutic exercise approach to target abdominal and pelvic floor symptoms among women who are postpartum[1]. However, evidence supporting this assumption is very week. There is a huge need of high-quality studies on a postpartum population,[2] so we could conduct a randomised trial on the effect of a specific exercise programme during postpartum period on DRA.

Methods: This study is planned to be an exploratory, assessorblinded, randomised trial carried out in a clinical/sports center. 100 postpartum women, both primiparous and multiparous, in the first 6 months postpartum presenting with DRA of ≥28 mm will be included. Participants will be allocated to either an intervention group or a control group by block randomisation. The intervention group will participate in a 12-week specific exercise programme. The control group will participate in a 12-week specific exercise programme including hypopressive exercises. Data collection will take place prior to intervention, postintervention at 6 and 12 months postpartum. The primary outcome measure will be change in the inter-recti distance, measured by two-dimensional ultrasonography.

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El transverso abdominal

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Es el músculo más profundo de la pared del abdomen y se origina en la cresta iliaca, ligamento inguinal y las apófisis transversas de las vértebras lumbares a través de la fascia toracolumbar. El transverso del abdomen tiene un papel fundamental por sus funciones de estabilización, control de la presión intraabdominal y por la sinergia que ha demostrado tener con el suelo pélvico debido a la contracción inconsciente del suelo pélvico al activar el transverso y viceversa.

Funciones:

- Estabilización de la región abdominal: mantenimiento de la postura y soporte visceral.
- Control de la presión intraabdominal (unto al diafragma y al suelo pélvico).
- Espiración forzada y estornudos.
- Micción y defecación.

Funciones en el embarazo y parto:

- Actúa como faja abdominal.
- Soporte visceral y alineación uterina.
- Favorece un correcto posicionamiento del feto.
- En la fase de expulsivo, su activación favorece que la fuerza no recaiga sobre la musculatura del suelo pélvico (pujo en espiración).
- Previene problemas/dolor en la región sacrolumbar, pues un transverso activo y funcional ayuda a un reparto del peso abdominal sin posturas compensatorias excesivas.

- En el posparto, favorece la recuperación y disminuye la diástasis abdominal.

El psoas iliaco

Se origina en la última vértebra dorsal así como en todas las vértebras lumbares, discurre detrás de los órganos internos y delante del hueso pubiano, se divide en Psoas mayor y Psoas menor. Pertenece a la pared posterior del core, siendo uno de los principales movilizadores. Su capacidad de adaptarse a las necesidades funcionales del core movilizando los miembros inferiores o generando una lordosis lumbar fisiológica, le otorga un papel imprescindible en el mantenimiento de la postura neutra de la pelvis en el plano sagital.

El recorrido del psoas por encima del hueso pubiano produce una fricción entre ellos que puede ocasionar inflamación del tendón y dolor en esa zona.

Una debilidad del psoas-iliaco puede ocasionar también una alteración en la marcha al ser el músculo principal en la flexión de la cadera.

Se suele acortar en el embarazo agravado por la hiperlordosis compensatoria. Es fundamental conseguir un conjunto psoas-iliaco flexibles para prevenir dolores lumbares y disminuir la carga muscular en la región posterior de la pelvis.

En el parto, una pelvis en anteversión y una hiperlordosis lumbar, dificultarán la entrada del feto en el estrecho superior pues chocaría con el hueso púbico. El papel del psoas es fundamental para corregir dicha hiperlordosis a través de la basculación de la pelvis y la activación de los músculos isquiotibiales, consiguiendo la retroversión necesaria que facilite la entrada del feto en el estrecho superior.

La morfología de la pared antero-lateral del abdomen cambia a medida que el embarazo avanza. Estos cambios modifican la conexión espacial entre los músculos abdominales superiores e inferiores, aumentando la longitud de los músculos abdominales, en particular de los rectos. En la semana 38 de gestación, la longitud de los músculos abdominales aumenta un 115% respecto al inicio del embarazo [1]. El incremento de la dimensión abdominal puede alterar el ángulo en que sus músculos se relacionan en el plano sagital. Estas alteraciones espaciales en el ángulo de inserción de los músculos pueden alterar su línea de acción y afectar a su capacidad de generar tensión.

La inclinación uterina, mantenida por la faja muscular del core, es un importante factor para alinear el eje fetal y el canal del parto. La inclinación del polo fetal es el ángulo entre el eje longitudinal materno y el polo fetal sin movimiento del feto o contracción. La inclinación uterina es el ángulo entre el eje longitudinal materno y el útero sin movimientos fetales ni contracción. Por lo tanto, la inclinación uterina es la misma que la inclinación del eje fetal[2]. Recientes estudios sugieren que una inclinación uterina anormal puede prolongar el trabajo de parto o incluso provocar su estancamiento, con el requerimiento del uso de cesárea [3]. Basándose en esta premisa, han nacido diversas escuelas de corrección postural de la madre previamente o durante el parto para tratar de alinear un eje fetal que se ve alterado por alteraciones pélvicas, diástasis de rectos o una excesiva laxitud de la pared abdominal y de los ligamentos pélvicos.

Varios estudios apuntan a que los ejercicios de tonificación del core centrados en la activación del músculo transverso, mejora la integridad de la línea alba e incrementa la tensión fascial ayudando a prevenir o reducir la diástasis de rectos [4]. Sin embargo, la actividad muscular depende enormemente de la posición de la pelvis durante la ejecución de los ejercicios. En particular, la inclinación posterior pélvica tiene una marcada influencia en la activación de la musculatura abdominal [5] para lo cual es necesaria la intervención de un psoas no acortado.

El diseño de módulos extensos y específicos centrados en el trabajo del core y de los flexores de la cadera y de la cadena posteror nos ayudaría a:

- Disminuir las molestias intrínsecas a los cambios musculoesqueléticos asociados al embarazo.
- La adquisición de un tono abdominal que ayude a la mujer a mantener un útero alineado con su eje longitudinal, disminuyendo distocias de rotación.
- La adquisición de propiocepción del músculo transverso, que le será de ayuda para ser capaz de activarlo a pesar de tener anestesia locorregional.
- La implicación de la pelvis en un amplio rango de movimientos que disminuya asimetrías o tensiones unilaterales.

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Feasibility of a Physical Activity Intervention with resistence training Among Obese Pregnant Women

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Trial design: Estudio piloto de intervención no ranzomizado para validar viabilidad de un programa de ejercicio físico de fuerza-resistencia en embarazadas obesas

Background: El entrenamiento de fuerza está demostrando ser muy efectivo en personas con sobrepeso y obesidad. Tradicionalmente a las embarazadas se les ha recomendado otro tipo de entrenamiento durante la gestación y la imagen de embarazadas obesas realizando ejercicios de fuerza no está muy extendida.

Las embarazadas obesas tienen durante la gestación a menudo problemas de movilidad y el ejercicio meramente aeróbico puede ser difícil de ejecutar por multitud de razones. No hay muchos estudios que hayan evaluado la viabilidad de entrenamientos basados en el entrenamiento de fuerza en mujeres embarazadas obesas.

Creemos que este tipo de entrenamiento guiado por un profesional puede ofrecer beneficios adicionales en este grupo de mujeres tanto en la regulación de la ganancia de peso como beneficios metabólicos.

Methods: Gestantes obesas con BMI igual o mayor de 30 en semana 12 sin contraindicaciones para ejercicio de resistencia

Intervencion: Programa de actividad física guiada 2-3 veces por semana basado en entrenamiento de fuerza y resistencia.

Objetivos: Demostrar la viabilidad de un programa de actividad física durante el embarazo en mujeres obesas para poder realizar en el futuro un estudio randomizado multicéntrico con una muestra mayor.

Outcomes: Las variables principales serán el porcentaje de pacientes que continua dentro del grupo de intervención a las 4 y 8 semanas y el porcentaje de embarazadas que abandona el entrenamiento y sus motivos. La interpretación de la intensidad del entrenamiento y el grado de satisfacción con el entrenamiento.

Otras variables: Ganancia de peso durante la gestación, diabetes gestacional, modo de parto, ph y Apgar fetal.Las embarazadas obesas detectadas durante la semana 12 (primera ecografia) serán invitadas a participar en el estudio, tanto en el grupo de intervención como en el grupo de control. El entrenamiento comenzara en semana 15 aproximadamente hasta el fin de la gestación

Feasibility of a Physical Activity Intervention with resistence training Among Obese Pregnant Women

Trial design: Non-ranzomized intervention pilot study to validate the feasibility of strength-resistance workout program in obese pregnant women

Background: Strength training it´s wide proven to be effective and benefitial in overweight and obese people in general. Traditionally, another type of workouts have been recomeneded to pregnant women and the image of obese pregnant women doing strength exercises is not very common. Obese pregnant women often have mobility problems during pregnancy and a

merely aerobic exercise can be difficult to perform for many reasons. Not many studies have evaluated the feasibility of strength training-based workouts in obese pregnant women.

We believe that this type of training, guided by a professional can offer additional benefits in this group of women in the regulation of weight gain and metabolic benefits.

Methods: Obese pregnant women with BMI equal to or greater than 30 at week 12 without contraindications for resistance exercise

Intervention: Guided physical activity program 2-3 times a week based on strength and resistance training.

Objectives: To demonstrate the feasibility of a physical activity workout program during pregnancy in obese women in order to carry out a multicenter randomized study with a larger sample in the future.

Outcomes: The main variables will be the percentage of patients who remain in the intervention group at 4 and 8 weeks and the percentage of pregnant women who drop out of training and their reasons. The interpretation of training intensity and the degree of satisfaction with training.

Other variables: Weight gain during pregnancy, gestational diabetes, mode of delivery, pH and fetal Apgar.

Obese pregnant women detected during week 12 (first ultrasound) will be invited to participate in the study, both in the intervention group and in the control group. The training will begin in week 15 approximately until the end of the pregnancy.

Prenatal physical activity counselling by prenatal healthcare providers:

what are they and how to improve them?

Stephanie-May Ruchat

Introduction: The benefits and safety of physical activity (PA) for the mother and her futur child are well documented and many countries and recognized societies/organisations have

developed Guidelines for prenatal PA. Unfortunately, statistics show that the vast majority of pregnant women are not sufficiently active and therefore do not benefit from PA. Several barriers to PA during pregnancy have been identified, including the lack of advice and information received from their prenatal health care providers (HCP). Prenatal HCP recognize their role and responsibility in promoting PA to their pregnant patients. However, they rarely fulfill this role due to lack of time, but more importantly, lack of knowledge and skills, inadequate or insufficient training and lack of resources. However, these barriers may vary by country of practice. It is therefore essential to have a broad understanding of the challenges prenatal HCP face when counselling women about prenatal PA, and their needs, in order to develop recommendations and ressources to support them in their role in providing prenatal PA advice and counselling to their pregnant patients.

Objectives: The objectives of this research project are therefore to document: 1) the training and knowledge of prenatal HCP regarding prenatal PA, and advice/counselling they offer to their pregnant patients; 2) prenatal HCP's needs to feel better equipped and more competent to support their patients toward a regular practice of prenatal PA; and 3) to develop recommendations and resources according to the results obtained through objectives 1 and 2.

Methodology: An electronic questionnaire will be developed by a committee of international experts. This questionnaire will be disseminated internationally through the researchers' networks. Focus group will be conducted with a subsample of participants in order to gather more detailed information about challenges and needs related to prenatal PA counselling. Results from the questionnaire and focus group will guide the development of recommendations and ressources, which will be available in several languages.

Scope of results: By providing prenatal HCP ressources about prenatal PA that are based on the most recent scientific evidence and that meet their needs, we hope to support them in their role in providing prenatal PA advice and counselling to their pregnant patients. This might, in turn, contribute to making pregnant women more physically active and consequently promote their health and that of their future child.

What does an active pregnancy look like? Changing the visual representation of physical activity in pregnancy with a focus on inclusion

Taniya S. Nagpal

Assistant Professor, University of Alberta

Individuals living with obesity are noted to have lower uptake of and adherence to pregnancy physical activity guidelines. Emerging evidence suggests that a key barrier to prenatal physical activity for individuals who have obesity is weight stigma. Weight stigma is defined as negative social stereotypes surrounding weight; WS can lead to weight bias internalization (WBI), whereby the person self-directs these ideas, and this is a detriment to mental health. In pregnancy, those who have obesity report higher frequency of weight stigmatizing experiences and levels of WBI. Recent evidence suggests that pregnant individuals do experience WS in physical activity contexts and especially in the media. One qualitative study interviewed pregnant individuals who had obesity on their suggestions for mitigating WS in physical activity contexts. The person-informed strategies to mitigate WS in pregnancy included body diverse representation of active pregnancies, including visuals of people of different sizes and abilities engaging in various activities. Working collaboratively, we can develop positive images of active pregnancies representing diversity by means of several factors including race, bodies, abilities and activities. The effect of these images can be tested on factors associated with physical activity adherence through online assessments comparing currently available, with representative images and identifying preference and intention. In collaboration with global organizations like The World Obesity Federation and Obesity Canada, these images could be incorporated into their image bank which is accessed by researchers, public health officials, and health promoters, and together, we can contribute to improving inclusivity in prenatal physical activity.

Title: Initiative for an International Centre for Maternal & Child Lifestyle Health, Development and Learning.

Michelle Mottola

We are in the process of submitting a draft proposal to the Dean in the Faculty of Health Sciences at Western University to become an International Centre for Maternal and Child Lifestyle Health, Development and Learning. This initiative was developed by an emerging team of core individuals with an interest in maternal and child lifestyle health. We conducted several environmental scans and found that there was a large interest on our campus. We defined "lifestyle" as the daily modifiable health behaviours that influence a person's risk of disease or injury, such as physical activity, nutrition, smoking and others that may be influenced by cultural beliefs, social determinants of health, and the environment in which they occur. We identified 5 important timelines where we believe we can impact lifestyle health. The first timeframe is during pregnancy, followed by the first year of life, preschool aged children, school aged children, and youth. Our vision is to design, implement and disseminate lab and community-based lifestyle research aimed at improving health and wellbeing during pregnancy, childhood, youth and family life in natural and controlled experiments while training highly qualified personnel and to disseminate knowledge to key partners such as community organizations and policy makers.

Epigenetic transmission during pregnancy

Linda May

Epigenetic transmission of cardiometabolic disease to an offspring increases their risk for development of cardiometabolic disease later in life. Furthermore, pregnancy acts as a physiological "window" into maternal future health or disease. With the increasing rates of obesity in women of child-bearing age, it is critical to develop strategies to prevent perpetuating cardiometabolic disease across generations. Data suggests that maternal exercise during gestation positively influences pregnancy outcomes and cardiometabolic health in mothers and children. Although it is known that maternal exercise is safe, there are many areas of investigation. Thus, to elucidate the positive cardiometabolic

adaptations of mother and child it is beneficial for an international team of investigators to develop a standardized approach to address these questions. The international team (i.e., The International Maternal Exercise Collaborative) will have regular meetings to ensure standardized protocols at each site and calibrate site investigators. TIME-C will provide opportunities for students, postdoctoral fellows, and investigators to have long- and short- term visits for further training and collaboration. Additionally, I propose for TIME-C to have annual conferences at a member site in order to 1) provide opportunities for students, postdoctoral fellows, and investigators to present and discuss findings, 2) tour site facilities, and 3) discuss publications, grants, next steps. Most importantly, this international network will provide an opportunity to advance our knowledge in the field and to move closer to all babies being born health and on-time.