

Table D.1.b. Gestational diabetes mellitus and physical activity, pregnant and postpartum women

Black font is from original GRADE Evidence Profile from the systematic review (Davenport 2018 (5)) to support the 2019 Canadian Guideline for Physical Activity Throughout Pregnancy. Red font denotes additions based on WHO update using review of existing systematic reviews. Two systematic reviews were identified that addressed the relationship between physical activity and gestational diabetes (16, 19).

Quality assessment							No of participants		Effect		Certainty	Importance
No of studies *	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Exercise	No exercise	Relative (95% CI)	Absolute (95% CI)		
Association between exercise-only interventions/prenatal exercise and gestational diabetes mellitus												
26	randomized trials	serious ^a	not serious	not serious	not serious	none	271/3505 (7.7%)	380/3429 (11.1%)	OR 0.62 (0.52 to 0.75)	39 fewer per 1 000 (from 25 fewer to 50 fewer)	⊕⊕⊕○ MODERATE	CRITICAL
Du 2018 (16) Low 10 randomized trials		not serious	not serious	not serious	not serious	none	Physical activity interventions during pregnancy were associated with reduced risk of GDM in pregnant women who were overweight or obese (RR = 0.71 [95% CI, 0.57 to 0.89], 10 RCTs, n=1,120; I ² =0%).			⊕⊕⊕⊕ HIGH	CRITICAL	
1 ^b	non-randomized studies	serious ^c	serious ^d	not serious	not serious ^e	none	Narrative Summary: In the study by Dyck (1999) (supervised exercise intervention, n=7), 3 women (43%) developed GDM.			⊕○○○ VERY LOW	CRITICAL	
14 (pooled estimate of effect ^f , n=9; 5 studies synthesized narratively)	cohort studies	serious ^g	not serious	not serious	not serious	none	189/6975 (2.7%)	154/2620 (5.9%)	OR 0.69 (0.54 to 0.88)	17 fewer per 1 000 (from 7 fewer to 26 fewer)	⊕○○○ LOW	CRITICAL
							Narrative Synthesis: Five cohort studies were included (n=19,803). 3/5 (n=16,814) reported between 11 to 90% decreased odds of GDM with prenatal physical activity compared to no exercise (Iqbal, 2007; Morkrid, 2014; Chasan-Taber, 2008). 2/5 (n=2989) reported that prenatal physical activity did not affect odds of GDM compared to no physical activity (Currie 2014; Chasan-Taber, 2015). Additional data from Badon (2016b) showed an association between LTPA and GDM. ^h					

Quality assessment							No of participants		Effect		Certainty	Importance		
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<p>Review (AMSTAR 2 rating)</p> <p>Mijatovic-Vukas 2018 (19) Moderate</p> <p>17 cohort studies</p>		serious ^p	not serious	not serious	not serious	none	<p>Physical activity was self-reported in all studies, with 10 studies measuring PA in pre-pregnancy and 9 studies measuring PA in early pregnancy. Overall, physical activity was reported to be protective against developing GDM in 13/17 studies. <u>Engaging in PA before pregnancy</u> was significantly associated with a reduced risk of GDM (OR = 0.70 [95% CI, 0.57 to 0.85], 11 studies, I²=52%) as was <u>engaging in any PA during early pregnancy</u> (OR = 0.79 [95% CI, 0.64 to 0.97], 8 studies, I²=26%). There was evidence that participating in higher (>15 MET-hr/wk) vs. lower (<15 MET-hr/wk) of LTPA pre-pregnancy was associated with a significantly lower risk of GDM (OR = 0.54 [95% CI, 0.34 to 0.87], 6 studies, I²=95%) as was participating in 90 min/week of LPTA during pre-pregnancy (OR = 0.54 [95% CI 0.34 to 0.87], 4 studies, I²=70%).</p>				⊕⊕○○ LOW	CRITICAL		
<p>7 (pooled estimate of effect, n=4^l; 3 studies synthesized narratively)</p>	cross-sectional studies	serious ^j	not serious	not serious	not serious	none	86/3265 (2.6%)	50/2375 (2.1%)	OR 0.66 (0.45 to 0.97)	7 fewer per 1 000 (from 1 fewer to 11 fewer)			⊕○○○ VERY LOW	CRITICAL
							<p>Narrative Synthesis: Three cross-sectional studies were included (n=12,189). 2/3 (n=739) reported no association between prenatal physical activity and (Li, 2014; Momeni Javid 2015). 1/3 (n=11,450) showed a decrease in odds of GDM with moderate to high activity compared to low activity (Leng, 2016). Additional data from Oken (2006) showed no effect of any light, moderate or vigorous intensity physical activity on GDM.^k</p>							
3 ^l	case-control studies	not serious ^m	serious ⁿ	not serious	serious ^o	none	74/271 (27.3%)	122/376 (32.4%)	OR 0.63 (0.30 to 1.31)	92 fewer per 1 000 (from 62 more to 199 fewer)			⊕○○○ VERY LOW	CRITICAL
							<p>Narrative Summary: Nasiri-Amiri (2016) (GDM, n=100; no GDM, n=100) found no association between prenatal physical activity and GDM, no matter the intensity of physical activity.</p>							

* Unless otherwise stated, all studies are included in the pooled estimate.

Abbreviations: CI = confidence interval; GDM = gestational diabetes mellitus; hr = hour; LTPA = leisure-time physical activity; MET = metabolic equivalent of task; OR = odds ratio; PA = physical activity; RCT = randomized clinical trial; RR = risk ratio; wk = week

^a Serious risk of bias. High risk of performance and attrition bias. Reporting bias was an issue in one study (results were reported narratively).

^b This study did not include a control group such that it could not be included in the meta-analysis (results were reported narratively).

^c Serious risk of bias. High risk of performance bias. This study did not include a control group such that it could not be included in the meta-analysis (narrative synthesis only).

^d Serious inconsistency. Only one study was included.

^e No serious imprecision; only one study but already downgraded for serious inconsistency for this reason.

^f Five studies could not be pooled due to incomplete reporting of results; results were reported narratively.

^g Serious risk of bias. Reporting bias was an issue in 6 studies (2/3 of the sample) (results were reported narratively).

^h Badon 2016a and Badon 2016b reported data from the same cohort study and were counted as one study. Data from Badon 2016a were included in the meta-analysis; data from Badon 2016b were reported narratively (incomplete reporting of data).

ⁱ Three studies could not be pooled due to incomplete reporting of results; results were reported narratively.

^j Serious risk of bias. High risk of performance bias (potentially flawed measurement of the exposure; unknown validity of prospective and retrospective physical activity measure). Reporting bias was an issue in 4 studies (3/4 of the sample); results were reported narratively.

^k Oken (2006) reported data that were included in the meta-analysis and data that were not (incomplete reporting of data; additional data were reported narratively)

^l One study could not be pooled due to incomplete reporting of results; results were reported narratively.

^m Reporting bias was an issue in one study (results were reported narratively).

ⁿ Serious inconsistency. High heterogeneity ($I^2 \geq 50\%$).

^o Serious imprecision. The 95% CI crossed the line of no effect, and was wide, such that interpretation of the data would be different if the true effect were at one end of the CI or the other.

^p Serious risk of bias. High risk of performance bias (potentially flawed measurement of the exposure; unknown validity of prospective and retrospective physical activity measure).