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| First author | Setting and Date | Inclusion exclusion criteria | Details of intervention | Maternal age – mean (SD) | Baseline BMI– mean (SD | Primipara (%) | C-section (%) | Preterm -<37 weeks (%) | Overall risk of bias |
| Althuizen75 | Netherlands  Feb 2005 – May 2006 | Singleton pregnancy, < 14 weeks gestation, nulliparous, literate in Dutch.  Sample: 246 (123 int, 123 con)  Final analyses (GWG only):106 int, 113 con | Four face-to-face counselling sessions regarding weight, PA and diet (8, 22, 30 and 36 weeks).  Duration: 30 weeks (including 8 weeks post-partum) | 29.2 (3.8), 30.4 (4.0), *p=*NR | 24.0 (4.2), 23.5 (3.8), *p=*NR**#** | - | 16, 21, *p*>0.05 | 6, 7, *p*>0.05 | Random: Low  AC: Unclear  Blinding: Unclear  Data: Low  SR: High  Other: Unclear |
| Asci76 | Istanbul, Turkey  Jun 2011 – Jul 2012 | Singleton pregnancy, > 18 years old, < 12 weeks gestation, no intention to lose weight during pregnancy.  Sample: 102 (51 int, 51 con)  Final analyses: 45 int, 45 con | One hour interviews regarding: GWG (weeks 12-15), PA (weeks 16-18), nutrition (weeks 20-24) and weight (week 37). Women given GWG card at baseline and weight was taken at each meeting.  Duration: 25 weeks | 24.3 (4.2), 24.3 (4.2), *p=*0.989 | 23.9 (4.1), 22.8 (3.9), *p=*0.285**#** | 0,0, *p=*NR | 37.8, 31.1, *p*=0.50 | - | Random: Low  AC: Unclear  Blinding: Unclear  Data: Unclear  SR: Unclear  Other: Unclear |
| Bogaerts31 | Flanders, Belgium  Mar 2008 – Apr 2011 | Singleton pregnancy, < 15 weeks gestation, obese, literate in Dutch.  Excluded: Type 1 diabetes, primary need for nutrition advice.  Sample: 205 (64 brochure, 78 LS, 63 con)  Final analyses: 58 brochure, 76 LS, 63 con | Brochure: A purpose-designed brochure regarding diet, PA and limiting excessive GWG.  LS: Four 1 ½ - 2 hour group sessions regarding energy intake. Recommended energy 50-55% CHO, 9-11% protein, 30-35% fat. Motivational interviewing, food diaries and label reading used (in addition to brochure).  Duration: 25 weeks | Brochure: 29.6 (4.9), Lifestyle: 28.8 (4.5), Control: 28.7 (4.2), *p=*0.48 | Brochure: 35.4 (5.2) Lifestyle:  34.4 (4.6) Control:  34.4 (4.1) *p=*0.42 | Brochure: 41.4, Lifestyle:  51.3, Control:  44.4, *p=*0.49 | Brochure: 24.1, Lifestyle: 26.4, Control: 30.2, *p=*0.77 | - | Random: Low  AC: Low  Blinding: Unclear  Data: Low  SR: Unclear  Other: Low |
| Dodd77 | Adelaide, Australia  Jun 2008 – Dec 2011 | Singleton pregnancy, 10 – 20 weeks gestation, overweight or obese.  Excluded: Pre-existing diabetes  Sample: 2212 (1108 int, 1104 con)  Final analyses: 1080 int, 1072 con | Three face-to face meetings and three phone calls consisting of dietary and LS advice. Women were provided with meal plans, recipes and snack ideas.  Duration: 22 weeks | 29.3 (5.4), 29.6 (5.6), *p=*NR | 31.0 (28.1 – 35.9), 31.1 (27.7-35.6), *p=*NR\*\*\* | 41.4, 40.2, *p=*NR | 34, 37, *p=*0.33 | 6,8, *p=*0.07 | Random: Low  AC: Low  Blinding: Low  Data: Unclear  SR: Low  Other: Low |
| Guelinckx27 | Leuven, Belgium  Mar 2006 – Jan 2008 | Singleton pregnancy, > 15 weeks gestation, obese, literate in Dutch.  Excluded: Pre-existing diabetes, GDM, metabolic disorders, Chrons disease, allergies, preterm birth.  Sample: 195 (65 passive, 65 active, 65 con)  Final analyses: 37 passive, 42 active, 43 con | Passive: A brochure regarding diet, PA and GWG.  Active: Three 1-hour group sessions. Recommended energy 55% CHO, 9-11% protein, 30-35% fat.  Participants advised on label reading, PA, emotional eating.  Duration: 25 weeks | Passive: 28.7 (4.0), Active: 28.0 (3.6),  Control:  29.4 (4.4), *p=*0.384 | Passive: 33.4 (3.1)  Active:  34.1 (4.5)  Control:  33.5 (3.9)  *p=*0.849**#** | Passive: 40.5  Active: 47.6  Control:  39.5 *p=*0.453 | Passive: 24.3  Active: 26.2  Control:  16.3, *p=*0.208 | - | Random: Unclear  AC: Unclear  Blinding: Unclear  Data: Low  SR: Unclear  Other: Low |
| Hawkins  78 | Massachusetts,  United States  Apr 2010 – Aug 2011 | Singleton pregnancy, 18 – 40 years old, < 18 weeks gestation, overweight or obese, < 30 minutes PA per week.  Excluded: T2DM diabetes, heart or renal disease, contraindications to moderate PA.  Sample: 68 (33 int, 35 con)  Final analyses: 32 int, 34 con | 6 face-to-face counselling sessions with 5 phone calls regarding diet and PA.  Duration: 20-26 weeks | ≥29 years: 24.2, 28.6 *p=*0.61 | Overweight:  45.5, 51.4  Obese:  54.5, 48.6, *p=*0.62\*\*\*\***#** | 19.4, 31.4, *p=*0.38 | - | - | Random: Unclear  AC: Unclear  Blinding: Unclear  Data: Low  SR: Unclear  Other: Low |
| Hui 201279 | Manitoba, Canada  Jul 2004 – Feb 2010 | Singleton pregnancy, < 26 weeks gestation.  Excluded: diabetes, contraindications to PA.  Sample: 224 (112 int, 112 con)  Final analyses: 102 int, 88 con | LS advice regarding PA and diet. Group PA sessions at local gym 3-5 times per week. 2 x dietary and  GWG counselling sessions provided at enrolment and 2 months after enrolment.  Duration: 10-16 weeks | 30.1 (5.2), 28.7 (5.9), *p=*NR | 24.9 (5.4), 25.7 (5.1), *p=*NR**#** | - | 2.0, 3.4, *p=*0.87 | - | Random: Low  AC: Low  Blinding: Unclear  Data: Low  SR: Unclear  Other: Low |
| Hui 201480 | Manitoba, Canada  May 2009 – Dec 2011 | Singleton pregnancy, < 20 weeks gestation.  Excluded: diabetes, contraindications to PA  Sample: 113 (57 int, 56 con)  Final analyses: 57 int, 56 con | LS advice regarding PA and diet. Group PA sessions 3-5 times per week. 2 x dietary and GWG counselling sessions provided at enrolment and 2 months after enrolment.  Duration: 27 weeks | BMI ≤ 24.9: 31(3), 29 (6), *p=*0.06  BMI ≥ 25:  31 (4), 32 (5), *p=*0.41 | BMI ≤ 24.9: 21.6 (2.2), 22.6 (1.9), *p=*0.06**#**  BMI ≥ 25:  29.5 (5.1), 29.7 (1.3) *p=*0.92**#** | - | - | - | Random: Low  AC: Low  Blinding: Unclear  Data: Low  SR: Unclear  Other: Low |
| Liang81 | Bingzhou, China  Jul 2005 – Nov 2008 | Singleton pregnancy, 6 – 16 weeks gestation, 22 – 42 years.  Excluded: BMI > 40, diabetes, premature birth.  Sample: 200 (114 int, 86 con)  Final analyses: 114 int, 86 con | Face-to-face lifestyle advice regarding diet and PA.  Recommended energy 40% CHO,  30% protein, 30% fat.  PA recommended 3 times/week.  Duration: 2nd trimester – birth | 28.7 (6.0), 28.4 (5.3), *p*>0.05 | 25.6 (5.9), 25.7 (5.0), *p*>0.05**#** | - | 14.6, 27.9,  *p*>0.05 | 0, 0, as per exclusion criteria | Random: High  AC: High  Blinding: High  Data: Unclear  SR: Unclear  Other: Unclear |
| Luoto82 | Pirkanmaa, Finland Oct 2007 – Dec 2008 | Singleton pregnancy, at least one risk factor for GDM.  Excluded: Abnormal baseline OGTT, pre-pregnancy diabetes, contraindications to PA, substance abuse, psychiatric illness.  Sample: 446 (246 int, 196 con)  Final analyses: 216 int, 179 con | LS advice regarding PA and diet in regular antenatal visits. PA counselling focused on increasing leisure time. Diet counselling based on the Finnish dietary recommendations.  Duration: 29 weeks | 29.5 (4.8), 30.0 (4.7), *p=*NR | 26.3 (4.9), 26.4 (4.3), *p=*NR**#** | 47.0, 40.6, *p=*NR | - | - | Random: Low  AC: Unclear  Blinding: Unclear  Data: Unclear  SR: Low  Other: Low |
| Petrella74 | Modena, Italy  April – Oct 2011 | Singleton pregnancy, > 18 years old, overweight or obese.  Excluded: chronic diseases, previous GDM, smokers, bariatric surgery, regular PA, supplements known to affect body weight.  Sample: 63 (33 int, 30 con)  Final analyses: 33 int, 28 con | A one-hour counselling session regarding an energy restricted diet: 1500kcal/day + 200 kcal/day for obese or 300kcal/day overweight. Women were also encouraged to exercise 30 minutes, 3 days per week.  Duration: 27 weeks | 31.5 (4.2), 32.4 (5.9), *p=*0.48 | 32.1 (5.0), 32.9 (6.2), *p=*0.56 | 39.4, 43.3, *p=*0.94 | - | - | Random: Low  AC: Low  Blinding: Unclear  Data: Unclear  SR: Unclear  Other: Low |
| Phelan83 | Rhode Island,  United States 2006 - 2008 | Singleton pregnancy, 6-16 weeks, > 18 years, BMI > 25, English or Spanish speaking  Excluded: HbA1c > 6.5, self-reported health issues, contraindication to exercise.  Sample: 264 (132 int, 132 EUC)  Final analyses: 129 int, 127 EUC. | Int: Face-to-face counselling, 20 mins, every two weeks or monthly. If not meeting GWG target, further counselling received.  EUC: Enhanced usual care received a 20 min welcome visit and newsletters about health-related topics every 2 months.  Duration: 27 weeks | 28.6 (5.2), 28.8 (5.2), *p=*0.72 | 26.3 (5.6), 26.5 (5.9), *p=*0.79 | 76.3, 76.6, *p=*0.51 | Healthy weight: 26.6, 27.2, *p=*NR  Overweight: 40.7, 48.8, *p=*NR | Healthy weight: 6.7, 14.1, *p=*NR\*\*  Overweight: 12.4, 8.1, *p=*NR\*\* | Random: Low  AC: Low  Blinding: Unclear  Data: Low  SR: Unclear  Other: Low |
| Polley43 | Pittsburgh, USA | Singleton pregnancy, >18 years of age, < 20 weeks gestation.  Excluded: underweight, high risk pregnancy.  Sample: 120 (61 int, 59 con)  Final analyses: 57 int, 53 con | Lifestyle advice offered at regular clinic visits regarding GWG, PA and diet. Between each visit women were mailed newsletters and contacted by phone. Women with excessive GWG were provided with extra counselling.  Duration: 24 weeks | 25.5 (4.8) | Healthy weight: 22.8 (1.9), 22.5 (2.0), *p=*NR**#**  Overweight: 31.4 (6.0), 34.1 (7.2), *p=*NR**#** | 47 | Healthy weight, 6.6, 12.9 *p=*NR  Overweight: 7.4, 27.3, *p=*NR | Healthy weight 16.7, 6.5, *p=*NR\*\*  Overweight: 7.4, 13.6, *p=*NR\*\* | Random: Unclear  AC: Unclear  Blinding: Unclear  Data: Low  SR: Unclear  Other: Low |
| Poston84 | United Kingdom | Singleton pregnancy, > 16 years, 15 – 18 weeks gestation, obese.  Excluded: Underlying disorders or prescribed metformin.  Sample: 1555 (783 int, 772 con)  Final analysis: 629 int, 651 con | Women received advice on self-monitoring, problem solving, barriers to behaviour change, and enlisting social support. Women set goals regarding PA and diet, received a PA DVD and were encouraged to choose low-GI CHO and reduce saturated fat.  Duration: 9 weeks | 30.5 (5.5), 30.4 (5.6), *p=*NR | 36.3 (5.0), 36.3 (4.6), *p=*NR | 43, 44, *p=*NR | - | - | Random: Low  AC: Unclear  Blinding: Unclear  Data: Unclear  SR: Low  Other: Unclear |
| Rauh85 | Munich, Germany  Feb 2010 – Aug 2011 | Singleton pregnancy, > 18 years old, < 18 weeks  gestation, ≤ 1 child.  Excluded: contraindications to PA, diabetes, uncontrolled chronic disease that may affect weight gain, psychiatric illness.  Sample: 250 (167 int, 83 con)  Final analyses: 152 int, 74 con | Two individual counselling sessions (at 20 and 30 weeks) regarding LS, self-monitoring, PA, weight and goal-setting.  Duration: 20 weeks | 32.2 (4.4), 30.8 (4.9), *p=*0.010 | 22.2 (20.7-24.3), 23.3 (21.2, 26.8),  *p=*0.008\*\*\* | - | 30.1, 41.8, *p=*0.076 | 2.6, 6.3, *p=*0.169 | Random: Unclear  AC: Unclear  Blinding: Unclear  Data: Low  SR: Unclear  Other: Low |
| Ruchat28 | Copenhagen, Denmark  Mar 2009 – Mar 2012 | Singleton pregnancy, > 18 years, < 16 weeks gestation, obese.  Excluded: diabetes, serious diseases limiting PA, bariatric surgery, alcohol or drug abuse.  Sample: 425 (142 PA + Diet, 142 PA, 141 con)  Final analyses: 130 PA + Diet, 125 PA, 134 con | PA + Diet: PA and diet intervention. Women advised to increase PA to 11,000 steps/day. They also had contact with a dietitian every 2 weeks (alternating between outpatients and phone calls).  PA: PA intervention. Women advised to increase PA to 11,000 steps per day.  Duration: 26 weeks | PA+D: 31.2 (4.4),  PA: 30.9 (4.9), Con: 31.3 (4.2), *p=*NS | PA+D: 34.4 (4.2)  PA: 34.1 (4.4), Con: 33.7 (3.5), *p=*NS**#** | PA+D: 53, PA: 54, Con: 56, *p=*NS | PA+D: 25, PA: 41, Con: 37, *p=*0.016 | PA+D: 3, PA: 6, Con: 5, *p=*NR | Random: Unclear  AC: Unclear  Blinding: Unclear  Data: Low  SR: Low  Other: Unclear |
| Renault26 | Ontario, Canada | Singleton pregnancy, > 18 years, 16 – 20 weeks gestation, healthy weight.  Excluded: > 40 years, chronic, disease, contraindications to PA.  Sample: 94 (23 low, 26 mod, 45 con)  Final analyses: 23 low, 26 mod, | Low: Low intensity PA regimen and modified GDM diet based on 8360kJ/day, 40-55% CHO, 20-30% protein, 30% fat.  Mod: Moderate intensity PA regimen with the same dietary advice as low intensity.  Duration: 20-24 weeks | Low: 31.0 (3.8), Mod: 30.4 (4.5), Con: 31.8 (4.2), *p=*NR | Low: 22.1 (1.7), Mod: 21.7 (1.9), Con: 22.4 (1.9), *p=*NR**#** | Low: 65, Mod: 50, Con: 42, *p=*NR | - | - | Random: Unclear  AC: Unclear  Blinding: Unclear  Data: Low  SR: Unclear  Other: Low |
| Sagedal86 | Norway  Sep 2009 - Feb 2013 | Singleton pregnancy, ≤20 weeks gestation, pre-pregnancy BMI ≥19 kg/m2, literate in Norwegian or  English.  Excluded: diabetes, contraindication to PA, substance abuse.  Sample: 606 (303 int, 303 con)  Final analyses: 296 int, 295 con | Two phone consultations (baseline and 4 – 6 weeks later). Dietary advice included portion sizes, regular meals, snacking, increasing intake of water, fruits, and vegetables. Women also provided access to a gym, cooking class, and LS booklet.  Duration: 24 weeks | 27.9 (4.2), 28.1 (4.5), *p=*0.56 | 23.8 (4.1), 23.5 (3.7), *p=*0.36**#** | - | 12.8, 12.2, *p=*NR | 5.7, 5.1, *p=*NR | Random: Low  AC: Low  Blinding: Low  Data: Low  SR: Low  Other: Low |
| Skouteris87 | Melbourne, Australia  Aug 2011 – Aug 2013 | Singleton pregnancy, >18 years old, <18 weeks  gestation.  Sample: 261 (131 int, 130 con)  Final analyses: 131 int, 130 con | Int: Individual and group health coaching regarding healthy LS for weight management, mood and body image. An initial individual session followed by two  phone-calls and two group sessions regarding healthy behaviours.  Con: Two 2-hour education sessions similar to the group sessions in the intervention group.  Duration: 24 weeks | 31.4 (4.9), 31.6 (4.5), *p=*NR | BMI <18.5: 3.9, 3.8, BMI 18.5-24.9: 55.4, 57.3, BMI: 25.0-29.9: 23.9, 25.2, BMI ≥30.0: 16.9, 13.7, *p*=NR\*\*\*\***#** | 44.6, 48.1, *p=*NR | 19.1, 17.3, *p=*NR | 3.1, 1.5, *p=*NR | Random: Low  AC: Low  Blinding: Low  Data: Unclear  SR: Unclear  Other: Low |
| Vesco88 | Oregon and Washington, United States  Oct 2009 - July 2011 | Singleton pregnancy, > 18 years, obese.  Excluded: diabetes, medical conditions requiring nutrition care.  Sample: 118 (58 int, 60 con)  Final analyses: 56 int, 57 con | Two individual counselling sessions at baseline and weekly group sessions to assist women to maintain their weight within 3% of their baseline weight. Dietary advice was based on DASH diet. Women were advised to participate in 30 mins of moderate PA per day.  Duration: 19-32 weeks | 32.4 (5.1), 31.2 (4.6), *p=*NR | 36.7 (5.2), 36.8 (4.7), *p=*NR | 46, 47, *p=*NR | 38, 45, *p=*NR | - | Random: Low  AC: High  Blinding: Unclear  Data: Low  SR: Unclear  Other: Low |
| Vinter89 | Denmark,  Oct 2007- 2010 | Singleton pregnancy, 18-40 years, 10-14 weeks  gestation, obese.  Excluded: chronic medical disorders, previous obstetric complications.  Sample 360 (180 int, 180 con)  Final analyses: 150 int, 154 con | Four dietary counselling sessions to limit GWG to 5kg. Energy based on BMI and 30-60 mins PA per day encouraged. Women provided with pedometer, gym membership, and one training session per week.   * Duration: 20 weeks | 29 (27-32), 29 (26-31), *p=*NR\*\*\* | 33.4 (31.7 -36.5), 33.3 (31.7-36.9), *p=*NR\*\*\* | 52.7, 54.6, *p=*NR | 26.7, 25.3, *p=*0.790 | - | Random: Low  AC: Low  Blinding: Unclear  Data: Low  SR: Low  Other: Low |
| Results presented: intervention, control. Abbreviations: IQR= Interquartile range, NR= not reported, NS= Not significant, PA= Physical activity, D = Diet, Int = intervention group, Con = control group, Random = Randomization; AC = Allocation concealment; Blinding = Blinding of participants, personal and outcome; Data = Incomplete data; SR = Selective reporting; Other = Other bias; PA = Physical activity; GDM = Gestational diabetes mellitus; T2DM = Type 2 diabetes mellitus; D = Diet; PA+D = Physical activity and diet; Mod = Moderate. Symbols:‘-‘ = data not available; #= Pre-pregnancy BMI; \*Low = low intensity physical activity + diet intervention; †Mod = moderate intensity physical activity +diet intervention; ‡Control= Dietary advice; \*\*<36 weeks; \*\*\*=Median (IQR); \*\*\*\*=%. | | | | | | | | | |