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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 |
| Diet |  |  |  |  |  |  |  |  |  |
| Garner90 | Ottawa, Canada  Sep 1991 – May 1994 | GDM singleton pregnancy.  Excluded: maternal-foetal blood  group incompatibility, congenital  abnormality, placental previa,  HTN, endocrine and hepatic  disorders, medical conditions  affecting glucose metabolism  Sample: 300 (150 int, 150 con)  Final analyses: 149 int, 150 con | Dietary counselling and a calorie-  restricted diet (35kcal/kg/day),  home glucose monitoring  techniques, and insulin if  required. Women seen bi-weekly.  Duration: 8 - 16 weeks | 30.7 (4.8), 30.7 (4.6), *p=*0.975 | - | - | - | - | Random: Low  AC: Unclear  Blinding: Unclear  Data: Low  SR: Unclear  Other: Low |
| Grant38 | Toronto, Canada  Apr 2006 - Jan 2007 | GDM singleton pregnancy, 26-32  weeks gestation, 20 – 40 years  old, BMI < 40kg/m2.  Sample: 38  Final analyses: 16 diet, 16 diet  and PA | Women were asked to follow a  low GI diet by exchanging CHO  foods with a range of low GI  Foods. Women also received non-  perishable, low GI foods each  week.  Duration: 8 weeks | 34 (0.1), 34 (1.1), *p=*NS | 27 (1), 26 (1), *p=*NS# | - | - | - | Random: Unclear  AC: Low  Blinding: Unclear  Data: Unclear  SR: Unclear  Other: Unclear |
| Louie34 | Camperdown, Australia | GDM singleton pregnancy, 20 –  32 weeks gestation, 18 – 45 years  old.  Excluded: Pre-existing diabetes,  special dietary requirements,  smoking, alcohol consumption.  Sample: 50 low-GI, 49 high fiber  Final analyses: 30 low-GI, 34  high fiber | Low-GI (LGI): GI < 50 with  recommended energy distribution  40-45% CHO, 15% protein, 25-  30% fat.  High fiber (HF): Low to moderate-GI  diet with recommended energy  40-45% CHO, 15% protein, 25-  30% fat.  Women attended at least three  face-to-face visits with dietitian.  Duration: 11 weeks | LGI: 34.0 (4.1), HF: 32.4 (4.5), *p=*0.062 | LGI: 23.9 (4.4), HF: 24.1 (5.7), *p=*0.837# | LGI: 61.7, HF: 64.4, =0.785 | Emergency: LGI: 20.5, HF: 11.6, *p=*0.263 | - | Random: Low  AC: Unclear  Blinding: Unclear  Data: Unclear  SR: Unclear  Other: Unclear |
| Moreno- Castilla91 | Catalonia, Spain  Nov 2008 – Jul 2011 | GDM singleton pregnancy, <35  weeks gestation, 18 – 45 years old  Spanish speaking.  Excluded: Pregnancy co-  morbidities other than obesity,  HTN, dyslipidaemia  Sample: 152 (76 int, 76 con)  Final analyses: 75 int, 75 con | A low CHO diet with energy  calculated according to pre-  pregnancy weight. Recommended  energy 40% CHO, 20% protein,  40% fat.  Duration: 10 weeks | 33.5 (3.7), 32.1 (4.4), *p=*0.14 | 25.4 (5.7), 26.6 (5.5), *p=*0.067# | 53.3, 49.3, *p=*0.74 | 33.8, 26.7, *p=*0.38 | - | Random: Unclear  AC: Unclear  Blinding: Unclear  Data: Unclear  SR: Unclear  Other: Unclear |
| Rae42 | Perth, Australia  Feb 1992 – Jun 1995 | GDM singleton pregnancy, < 36  weeks, > 110% ideal body weight  Sample size: 125 (67 int, 58 con)  Final analyses: 63 int, 54 con | Int: Moderately energy restricted  diabetic diet (6800-7600kJ/day).  Con: Diabetic diet that was not  energy restricted.  Duration: 12 weeks | 30.2, 30.6, *p=*0.661 | 37.9 (0.7), 38.0 (0.7), *p*=0.900 | 18, 17, *p=*0.732 | 40, 33.9, *p=*NR | - | Random: Low  AC: Low  Blinding: Unclear  Data: Unclear  SR: Unclear  Other: Unclear |
| Zhang 201192 | Shandong, China  Feb 2009 – Jul 2009 | GDM singleton pregnancy  Excluded: pre-existing diabetes  Sample: 207 (110 int, 97 con)  Final analyses: 110 int, 97con | - | - | - | - | - | - | Random: High  AC: High  Blinding: High  Data: Unclear  SR: Unclear  Other: Low |
| Metformin | | |  |  |  |  |  |  |  |
| Ainuddin30 | Karachi, Pakistan Dec 2008 – Dec 2010 | GDM singleton pregnancy, 20 –  36 weeks gestation, 20 – 46 years  old, BMI > 25kg/m2.  Excluded: contraindications for  metformin, foetal abnormality,  diabetes, foetal growth restriction.  Sample: 186 (93 metformin, 93  insulin)  Final analyses: 75 metformin, 75 | Metformin (M) : 500 - 2500mg (3  divided doses) until glycaemic  control achieved.  Insulin (I): Combination of short and  intermediate acting insulin, 2 x  daily.  Duration: 4 - 20 weeks | M: 30.6 (2.9), I: 31 (4), M+I: 30 (3.3), *p=*NR | - | - | M: 41.9, I: 56.3, M+I: 50.7, *p=*NR | - | Random: High  AC: Unclear  Blinding: Unclear  Data: Unclear  SR: Unclear  Other: Unclear |
| Niromanesh93 | Tehran, Iran  Dec 2010 – Jan 2012 | GDM singleton pregnancy, 20 –  34 weeks gestation, 18 – 40 years  old.  Excluded: Cardiovascular, renal,  liver or autoimmune disease,  substance abuse, pre-existing  diabetes, major foetal  malformation  Sample: 172 (86 metformin, 86  insulin)  Final analyses: 80 metformin, 80  insulin | Metformin (M): 2 x 500mg dose/day  and increased over 2 weeks until  glycemic control achieved (a  maximum of 2500mg divided  between meals).  Insulin (I): Intermediate-acting  insulin (and short-acting if  required)  Duration: 11 weeks | M: 30.7 (5.5), I: 31.8 (5.1), *p=*0.217 | M: 28.1 (4.0), I: 27.1 (2.1), *p=*0.064 | M: 85, I: 80, *p=*0.690 | M: 42.5, I: 46.3, *p=*0.633 | M: 11.3, I: 5.0, *p=*0.148 | Random: Low  AC: Low  Blinding: Low  Data: Unclear  SR: Unclear  Other: Unclear |
| Rowan94 | Australia and New Zealand  Oct 2002 – Nov 2006 | GDM singleton pregnancy, 20 -  33 weeks gestation, 18 – 45 years  old, met hospital’s criteria for  starting insulin.  Excluded: pre-existing diabetes,  contraindication to metformin,  foetal abnormality, HTN,  preeclampsia, foetal growth  restriction, ruptured membranes  Sample: 751 (373 metformin, 378  insulin)  Final analyses: 363 metformin,  370 insulin | Metformin: 1-2 x 500mg dose/day  and increased over 2 weeks until  glycaemic control achieved  (maximum of 2500mg). If targets  were not achieved with  metformin, insulin was added.  Duration: 10 weeks | M: 33.5 (5.4), I: 33.0 (5.1), *p=*NR | M: 32.2 (8.2), I: 31.9 (7.6), *p=*NR\* | M: 31.7, I: 31.9, *p=*NR | - | M: 12.1, I; 7.6, *p=*0.04 | Random: Unclear  AC: Unclear  Blinding: Unclear  Data: Low  SR: Low  Other: Unclear |
| Silva41 | Brazil  Jul 2008 – Oct 2009 | GDM singleton pregnancy, 11 –  33 weeks gestation, > 18 years old  Excluded: intolerance to  hypoglycaemic medications,  foetal malformation on delivery  Sample: 81 randomized  Final analyses: 40 glyburide, 32  metformin | Glyburide (G): 2.5mg prior to  breakfast and dinner initially, then  increased by 2.5-5mg each week  until glycaemic control was  achieved.  Metformin (M): 500mg prior to  breakfast and dinner initially, then  increased by 500-1000mg until  glycaemic control was achieved.  Duration: 15 weeks | G: 31.5 (5.4), M: 33.6 (5.8), *p=*0.11 | G: 28.8 (5.8), M: 30.3 (5.7), *p=*0.32# | Parity  G: 2.8 (1.5), M: 2.9 (1.2), *p=*0.33\*\* | G: 70, M: 68.7, *p=*0.91 | - | Random: Low  AC: Low  Blinding: Unclear  Data: Low  SR: Unclear  Other: Unclear |
| Spaulonci95 | Sao Paulo, Brazil  Nov 2007 – Jan 2010 | GDM singleton pregnancy  Excluded: Risk factors for lactic  acidosis, anatomic or  chromosomal abnormalities.  size: 94 (47 metformin, 47  insulin)  Final analyses: 46 metformin, 46  insulin | Metformin (M): 850mg, three times  daily and raised until glycaemic  control achieved. If glycaemic  control was not achieved, insulin  was introduced.  Insulin (I): A starting dose of 0.4  units/kg/day until glycaemic  control achieved.  Duration: 8 weeks | M: 31.9 (6.0), 32.8 (4.7), *p=*0.464 | M: 28.7 (5.6), I: 28.0 (5.9), *p=*0.563# | Parity  M: 1 (0-5), I: 1 (0-6), *p=*0.072\*\*\* | - | - | Random: Low  AC: Unclear  Blinding: Unclear  Data: Unclear  SR: Unclear  Other: Unclear |
| Tertti96 | Turku, Finland  Jun 2006 – Dec 2010 | GDM singleton pregnancy.  Excluded: Cardiac or renal  insufficiency, liver disease,  metformin use 3 months  preceding OGTT, self-measured  plasma glucose value >7.0mmol/L  or 60 mins postprandial glucose  value > 11.0mmol/L.  Sample: 221 (110 metformin, 111  insulin)  Final analyses: 110 metformin,  107 insulin | Metformin (M): 1 x 500mg/day and  increased until glycaemic control  achieved (a maximum dose of 1g,  twice daily).  Insulin (I): Long-acting insulin  and/or rapid acting inulin or  insulin aspart.  Duration: 10 weeks | M: 31.9 (5.0), I: 32.1 (5.4), *p=*0.80 | M: 29.4 (5.9), I: 28.9 (4.7), *p=*0.74 | M: 38.2, I: 44.9, *p=*0.45 | M: 13.6, I: 16.8, *p=*0.55 | M: 5.5, I: 3.7, *p=*0.37 | Random: Unclear  AC: Unclear  Blinding: Unclear  Data: Unclear  SR: Low  Other: Unclear |
| Lifestyle |  |  |  |  |  |  |  |  |  |
| Chen101 | Foshan, China  Oct 2001 – Oct 2005 | GDM singleton pregnancy.  Sample: 79 (43 int, 36 con)  Final analyses: 43 int, 36 con | Participants were given a  pamphlet regarding nutrition and  their intake was assessed. They  were also encouraged to  participate in 30 minutes PA/day.  Duration: 12 - 16 weeks | 29.0 (2.6) | - | - | 14.0, 52.8, *p*<0.05 | 2.3, 19.4, *p*<0.05 | Random: High  AC: High  Blinding: High  Data: Unclear  SR: Unclear  Other: Unclear |
| Sun97 | Guangzhou, China  May 2012 – Dec 2012 | GDM singleton pregnancy  Sample: 158 (78 int, 80 con)  Final analyses: 78 int, 80 con | Face-to-face dietary consultation  regarding glycaemic load and  exercise | - | - | - | - | - | Random: Low  AC: Low  Blinding: High  Data: Low  SR: Low  Other: Unclear |
| Xie98 | Wuzhou, China  Oct 2006 – Oct 2010 | GDM singleton pregnancy  Excluded: Diabetes or insulin  treatment prior to pregnancy  Sample: 36 (18 int, 18 con)  Final analyses: 18 int, 18 con | Individualised recommendations  including calorie requirements  based on BMI, macronutrient  distribution of energy intake,  distribution of energy intake  throughout the day and 30 mins  PA/ day.  Duration: 12 weeks | 29.8 (5.9) | - | - | - | - | Random: High  AC: High  Blinding: High  Data: Unclear  SR: Low  Other: Unclear |
| Yang99 | Tianjin, China  Dec 2010 – Oct 2012 | GDM singleton pregnancy  Excluded: pre-existing diabetes, <  18 years old, maternal-foetal  blood type incompatibility, HTN,  thyrotoxicosis, long-term  medications that might affect  glucose metabolism  Sample: 706 (344 int, 362 con)  Final analyses 339 int, 361 con | Blood-glucose monitoring and  diet and PA advice at baseline.  Recommended energy intake  based on pre-pregnancy BMI with  30 minutes PA/day. Women also  offered additional individual and  group education sessions  throughout pregnancy  Duration: 14 weeks | 29.9 (3.5), 29.7 (3.2), *p=*0.475 | 22.9 (3.6), 23.4 (3.9), *p=*0.111# | 95.3, 95.0, *p=*0.870 | 70.5, 64.5, *p=*0.093 | 5.3, 7.8, *p=*0.192 | Random: Low  AC: Unclear  Blinding: Unclear  Data: Unclear  SR: Unclear  Other: Unclear |
| Zhang 2012100 | Shenzhen, China  Jul 2009 – Jan 2011 | GDM singleton pregnancy, 24 –  28 weeks gestation.  Excluded: Liver, kidney or  metabolic disease.  Sample: 76 (39 int, 37 con)  Final analyses: 39 int, 37 con | Face-to-face, individualised  dietary instruction with caloric  restriction based on BMI. Intake  to be distributed throughout the  day. Women also advised to  participate in 30 minutes of  physical activity/day.  Duration: 12 weeks | 31.8 (3.6), 31.9 (3.6), *p*>0.05 | 21.6 (2.1), 21.8 (2.1), *p*>0.05# | - | - | 5.1, 10.8,  *p* >0.05 | Random: Low  AC: Unclear  Blinding: High  Data: Low  SR: Low  Other: Low |
| Physical Activity | |  |  |  |  |  |  |  |  |
| Halse102 | Perth, Australia | GDM singleton pregnancy.  Excluded: maternal-foetal blood  group incompatibility, congenital  abnormality, placental previa,  HTN, endocrine and hepatic  disorders, medical conditions  affecting glucose metabolism  Sample: 300 (150 int, 150 con)  Final analyses: 149 int, 150 con | 3 supervised home-based PA  sessions/week and 2 unsupervised  PA sessions on alternate days.  Duration: 5 -7 weeks | 34 (5), 32 (3), *p=*NR | 25.2 (6.7), 26.4 (7.1), *p=*NR | Parity  1 (1), 1 (1), *p=*NR | 25, 26, p>0.05 | 15, 11, p>0.05 | Random: Unclear  AC: Low  Blinding: Unclear  Data: Unclear  SR: Unclear  Other: Unclear |
| Other |  |  |  |  |  |  |  |  |  |
| Jie103 | Guangdong, China  Sep 2012 – Sep 2014 | GDM singleton pregnancy, 21 –  40 years old, hospitalised from 30  weeks gestation.  Excluded: pre-existing diabetes,  underweight or obese prior to  pregnancy, repeated abortions,  heart, liver or kidney disease.  Sample: 200 (100 int, 100 con)  Final analyses: 100 int, 100 con | Trinity seamless care service  involving a multidisciplinary team  of practitioners, nurses, and  endocrinologists. Family-centred  advice and support developed  according to nutritional status and  BMI of women.  Duration: 10 weeks | 27.1 (4.5), 26.7 (4.9), *p=*0.548 | 22.0 (2.8), 21.8 (3.0) *p=*0.626# | - | 34.0, 63.0, p<0.001 | - | Random: Unclear  AC: Unclear  Blinding: High  Data: Unclear  SR: Unclear  Other: Unclear |
| Results presented: Intervention, control. M = Metformin, I= Insulin, G= Glyburide, LGI= Low Glycaemic Index, HF= High Fibre, NS= Not significant, NR= Not reported, 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; G = Glyburide; LGI = low-glycemic index; HF = High fibre; GDM = Gestational diabetes mellitus; BMI = Body Mass Index; M = Metformin; I – Insulin; M+I = Metformin and insulin; HTN = Hypertension; PA = Physical activity. Symbols: ‘-‘= data not available; # = Pre-pregnancy BMI; \*= Early pregnancy; \*\*= Mean (SD); \*\*\*=Median (min-max). | | | | | | | | | |