**Online Table 2: Evidence extracted from reviews of individual level behavioural interventions to reduce blood glucose or reduce weight in people with glucose dysregulation (diabetes or pre-diabetes)**

| **2.1: Overall effectiveness** | | | | | | | | | |
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| **Study** | **Comparison** | **Target behaviors** | **Method of comparison** | **OQAQ** | **N studies (N participants)** | **Outcome** | **Follow up** | **Results** | **Comments/ Limitations** |
| Taylor et al. 2016 | Behavioural intervention versus control | Diet and PA | Descriptive | 17 | 4 (NR) | HBA1c | 3 to 18 months | One study showed that patients randomised to the intervention group showed improvements in HbA1c compared to the control group. | Only narrative summary |
| Taylor et al. 2016 | Behavioural intervention versus control | Diet and PA | Meta-analysis | 17 | 3 (140) | HBA1c | 3 to 18 months | Behavioural interventions did not show a significant mean difference in lowering HbA1c when compared to control groups (MD = 0.18%; 95% CI, [-0.07, 0.42]; p = 0.16). | Results are based on only based on three small studies |
| Cradock et al. 2017 | Dietary intervention only vs control | Diet | Meta-analysis | 14 | 59 (4882) | HbA1c | 1 to 24 months | Reduction in HbA1c of 0.35%, 95% CI: -0.43 to -0.28. | Only small amounts of data beyond 12 months |
| Mudaliar et al. 2016 | Lifestyle intervention versus control | Diet and PA | Meta-analysis | 16 | 8 (NR) | HbA1c | 3 to 36 months | Lifestyle interventions significantly reduced weight by -0.21% (95% CI: -0.29 to -0.13) at follow up. | Only pre-post comparisons |

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| Zhang et al. 2016 | Lifestyle intervention versus control | Diet and PA | Meta-analysis | 18 | 13 (3186) | HbA1c | 12 to 54 months | Lifestyle interventions significantly reduced HbA1c when compared to control (-0.06%, 95% CI: -0.09 to -0.03). | |
| Taylor et al. 2016 | Behavioural intervention versus control | Diet and PA | Descriptive | 17 | 12 (NR) | FPG | 12 weeks to 18 months | Three studies showed that patients randomised to the intervention group showed improvements in FPG compared to the control group. | Only narrative summary |
| Taylor et al. 2016 | Behavioural intervention versus control | Diet and PA | Meta-analysis | 17 | 10 (956) | FPG | 12 weeks to 18 months | Behavioural interventions showed a significant mean reduction of FPG when compared to control (-0.28mmol/L (95% CI, [-0.43, -0.12]; p<0.001). | Investigation of baseline imbalance showed that controls had slightly lower levels of fasting glucose (MD = 0.10mmol/L; 95% CI, [-0.02, 0.23]; p = 0.10). |
| Sun et al. 2017 | Lifestyle intervention versus control | Diet and PA | Meta-analysis | 16 | 41 (NR) | FPG | 12 months | Lifestyle interventions significantly reduced FPG by 1.65 mg/dL (95% CI: 0.14 to 3.17) when compared to control. | |
| Mudaliar | Lifestyle | Diet and | Meta- | 16 | 21 (NR) | FPG | 3 to 36 | Lifestyle interventions significantly | Only pre-post |

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| et al. 2016 | intervention versus control | PA | analysis | | | | months | reduced FPG by -2.40mg/dl (95% CI: -3.59; to -1.21) at follow up. | comparisons |
| Zhang et al. 2016 | Lifestyle intervention versus control | Diet and PA | Meta-analysis | 18 | 55 (9234) | FPG | 12 to 54 months | Lifestyle interventions significantly reduced FPG when compared to control (-0.14mmol/L, 95% CI: -0.19 to -0.10). | |
| Sun et al. 2017 | Lifestyle intervention versus control | Diet and PA | Meta-analysis | 16 | 19 (NR) | 2-h BG | 12 months | Lifestyle interventions significantly reduced 2-h BG by 7.21 mg/dL (95% CI: 1.95 to 16.36) when compared to control. | |
| Zhang et al. 2016 | Lifestyle intervention versus control | Diet and PA | Meta-analysis | 18 | 33 (5308) | FI | 12 to 54 months | Lifestyle interventions significantly reduced FI when compared to control (-15.18 %,, 95% CI:-20.01 to -10.35). | |
| Zhang et al. 2016 | Lifestyle intervention versus control | Diet and PA | Meta-analysis | 18 | 20 (2966) | HOMA-IR | 12 to 54 months | Lifestyle interventions significantly reduced HOMA-IR when compared to control (-22.82%, 95% CI: -29.14 to -16.51). | |
| Sun et al. 2017 | Lifestyle intervention versus control | Diet and PA | Meta-analysis | 16 | 64 (NR) | Weight | 12 months | Lifestyle interventions significantly reduced weight by 2.07 kg (95% CI: 1.52 to 2.62)when compared to control. | |
| Cradock et al. | Dietary intervention | Diet | Meta- | 14 | 54 (4496) | Weight | 1 to 24 | Reduction in weight of 2.41Kg, 95% | Only small amounts of data |

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| 2017 | only vs control | | analysis | | | | months | CI: -2.96 to -1.86. | beyond 12 months |
| Mudaliar et al. 2016 | Lifestyle intervention versus control | Diet and PA | Meta-analysis | 16 | 16 (NR) | Weight | 3 to 36 months | Lifestyle interventions significantly reduced weight by 2.66 kg when compared to control. | RCT design but no P values or CI reported |
| Zhang et al. 2016 | Lifestyle intervention versus control | Diet and PA | Meta-analysis | 18 | 49 (8728) | Weight | 12 to 54 months | Lifestyle interventions significantly reduced weight when compared to control (-3.99kg, 95% CI: -4.69 to -3.29). | |
| Barry et al. 2017 | Diet and .or PA intervention vs control | Diet, PA | Meta-analysis | 16 | 25 (10,593) | Incidence of type 2 diabetes | up to 72 months | Lifestyle interventions reduced the relative risk of developing diabetes by 36% (95%CI: 28 to 43%). | |
| Modesti et al. 2016 | Lifestyle interventions versus control | Diet and PA | Meta-analysis of RCTs making this comparison | 18 | 8 (2721) | Incidence of type 2 diabetes | 18 to 72 months | There was a 45 % reduction in the incidence of T2DM for people assigned to the intervention arm versus control (OR 0.55; 95 % CI 0.44–0.70). | |
| **2.2: Maintenance of effects** | | | | | | | | | |
| **Study** | **Comparison** | **Target behaviors** | **Method of comparison** | **OQAQ** | **N studies (N participants)** | **Outcome** | **Follow up** | **Results** | **Comments/ Limitations** |

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| Barry et al. 2017 | Intervention effects after end of intervention vs during intervention | Diet, PA | Sub-group meta-analyses | 16 | 6 (13630) | Incidence of type 2 diabetes | NR | Relative risk reduction for developing diabetes due to interventions fell to 20% (95%CI: 18 to 31%) in the period after intervention ceased. The reduction within the trial period was 36% (95%CI: 28 to 43%). | |
| Zhang et al. 2016 | Lifestyle intervention versus control stratified by follow-up period | Diet and PA | Sub-group meta-analysis | 18 | 9 (2875), 1 (158), 4 (1242) | HbA1c | 12 months, 13 to 23 months, ≥23 months | Lifestyle interventions had similar reductions in HbA1c when compared to control at 12 months (- 0.06%, 95% CI: -0.09 to -0.02), 13 to 23 months, (- 0.10%, 95% CI: -0.18 to -0.02), and no reduction at ≥23 months, (- 0.03%, 95% CI: -0.23 to -0.001). | Only 1 study for 13 to 23 months |
| Beishuizen et al. 2016 | Short term vs long term outcomes | Multiple CV prevention behaviours (inc diet, PA, glucose monitoring, medication use) | Sub-group meta-analyses<br><br>Meta-regression | 14 | 37 (11021)<br><br>15 (2934) short term<br><br>22 (8087) long term | SMD (Hedge's g) used to pool primary outcome measures: SBP (7); HbA1c (13); weight (8); PA (6); CV composite | 0-12<br><br>12--60 months<br><br>(overall median 12 months) | The intervention effect was more pronounced in the short-term studies SMD –0.43, 95% CI: –0.57 to –0.29) than in the long-term studies (SMD –0.12, 95% CI: –0.19 to –0.06; I2=41%).<br><br>A meta-regression excluding one outlier with a 5 year follow-up found that effect size significantly decreased over time in studies | |

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| | | | | | | score (3) | | lasting 3 to 32 months (SMD –0.415+ 0.015*months; P=.008). | |
| Zhang et al. 2016 | Lifestyle intervention versus control stratified by follow-up period | Diet and PA | Sub-group meta-analysis | 18 | 46 (7626), 8 (1560), 15 (3423) | FPG | 12 months, 13 to 23 months, ≥23 months | Lifestyle interventions had similar reductions in FPG when compared to control at 12 months (- 0.11mmol/L 95% CI: -0.15 to -0.07), 13 to 23 months, (- 0.15mmol/L 95% CI: -0.21 to -0.09), and ≥23 months, (- 0.12mmol/L 95% CI: -0.23 to -0.001). | |
| Zhang et al. 2016 | Lifestyle intervention versus control stratified by follow-up period | Diet and PA | Sub-group meta-analysis | 18 | 25 (4521), 4 (496), 15 (3426) | FI | 12 months, 13 to 23 months, ≥23 months | Lifestyle interventions had similar reductions in FI when compared to control at 12 months (- 15.45 %, 95% CI: -21.22 to -9.69), ≥23 months, (- 11.30 %, 95% CI: -18.68 to -3.91) but no reduction at 13 to 23 months, (- 11.04 %, 95% CI: -22.33 to 0.25). | Only 4 studies for 13 to 23 months |
| Zhang et al. 2016 | Lifestyle intervention versus control stratified by follow-up period | Diet and PA | Sub-group meta-analysis | 18 | 16 (2267), 1 (158), 7 (1567) | HOMA-IR | 12 months, 13 to 23 months, ≥23 months | Lifestyle interventions had similar reductions in HOMA-IR when compared to control at 12 months (- 24.56% 95% CI: -35.52 to -13.61), ≥23 months, (-20.07%,95% CI: -27.73 to -12.40) but no reduction at 13 to 23 months, (- 14.63%, 95% CI: -32.44 to 3.18). | Only 1 study for 13 to 23 months |
| Cai et al. | Post-intervention | PA | Sub-group meta- | 14 | 2 (133) | BMI | Mean 7.7 months | Intervention group had no significant BMI or weight reduction or regain | Low N for this |

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| 2016 | period effects of pedometer based intervention vs no intervention. | | analysis | | | Weight | of follow up post intervention | over the follow-up period.<br><br>BMI: WMD -0.21 kg/m2 (95% CI: -1.06 to 0.65).<br><br>Weight: WMD -0.05 kg (95% CI: -1.06 to 0.95). | meta-analysis. |
| Cradock et al. 2017 | Effects of dietary intervention only vs control stratified follow-up period | Diet | Sub-group meta-analyses | 14 | 0-3month:<br>32 (2416)<br><br>3-6month:<br>24 (2850)<br><br>6-12month:<br>14 (1704)<br><br>12-24month:<br>4 (205) | Weight | 0-3<br><br>3-6<br><br>6-12<br><br>12-24 months | Weight loss was fairly consistent over time for up to 24 months of follow up.<br><br>0-3months: 2.34 kg (95% CI: -2.99, to -1.69),<br><br>3-6month: -2.94 kg (95% CI: -3.92, to -1.97).<br><br>6-12months: 2.27 kg (95% CI: -3.32 to -1.21). | Only small amounts of data beyond 12 months |

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| | | | | | | | | 12-24months: -2.14 kg (95% CI: -3.34 to -0.93. | |
| Zhang et al. 2016 | Lifestyle intervention versus control stratified by follow-up period | Diet and PA | Sub-group meta-analysis | 18 | 41 (7188), 6 (1289), 15 (3424) | Weight kg | 12 months<br><br>13 to 23 months<br><br>≥23 months | Lifestyle interventions had similar reductions in % body weight when compared to control at 12 months (-3.68 95% CI: -4.50 to -2.87), 13 to 23 months (-3.28 95% CI: -4.39 to -2.17) and ≥23 months (- 3.58 95% CI: -4.98 to -2.19). | |
| Mudaliar et al. 2016 | Lifestyle intervention with maintenance component versus no maintenance component | Diet and PA | Sub-group meta-analysis | 16 | 16 (NR) | Weight | 3 to 36 months | Lifestyle interventions with a maintenance component had a larger reduction in weight (-4.36 kg, 95% CI: -5.47 to -3.26) than interventions with no maintenance component (-2.70 kg, 95% CI: -3.59 to -1.80). | Very small overlap in CIs meaning that these differences are likely to be significant |
| Mudaliar et al. 2016 | Lifestyle intervention with maintenance | Diet and PA | Meta-analysis | 16 | 21 (NR) | FPG | 3 to 36 months | Lifestyle interventions with a maintenance component had a significantly larger reduction in FPG (-4.00 mg/dl, 95% CI: (-4.93 to -3.07) | Non-overlapping CIs indicating significance |

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| | component versus Lifestyle intervention with no maintenance component | | | | | | | than interventions with no maintenance component (-0.86 mg/dl, 95% CI: (-2.75 to 1.03). | |
| **2.3: Behavioural target** | | | | | | | | | |
| Zhang et al. 2016 | Lifestyle intervention versus usual care stratified by only PA, only diet and diet + PA | PA only<br>Diet only<br>PA and diet | Sub group meta-analysis | 18 | 3 (1227), 1 (50), 9 (1909) | HbA1c | 12 to 54 months | Lifestyle interventions showed no significant reductions in HbA1c for PA (-0.04% 95% CI: -0.08 to 0.01), diet (-0.04%, 95% CI: -0.23 to 0.23), but small reductions for diet + PA (--0.07% 95% CI: -0.12, -0.03). | Small number of studies for all groups |
| Taylor et al. 2016 | Behavioural intervention versus control (Only PA) | PA component present | Sub group meta-analysis | 17 | 7 (NR) | FPG | 12 weeks to 18 months | Participants receiving an intervention that included PA showed an improvement in FPG (-0.33mmol/L, 95% CI:-0.52 to -0.14], p = 0.001) compared to usual care. | Interventions could also include other components |
| Zhang et al. 2016 | Lifestyle intervention versus usual care stratified by | PA only<br>Diet only<br>PA and diet | Sub group meta-analysis | 18 | 14 (1813), 7 (499), 34 (7021) | FPG | 12 to 54 months | Lifestyle interventions had largest reduction in FPG when diet was targeted (-0.17 mmol/l, 95% CI: -0.27 to -0.08) followed by PA + diet (-0.15 mmol/l, 95% CI: -0.21 to -0.09) | Only 7 studies for diet could be reason for large effect |

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| | only PA, only diet and diet + PA | | | | | | | followed by PA alone ( - 0.07 mmol/l, 95% CI: -0.11 to -0.03). | |
| Zhang et al. 2016 | Lifestyle intervention versus usual care stratified by only PA, only diet and diet + PA | PA only<br>Diet only<br>PA and diet | Sub group meta-analysis | 18 | 9 (1555), 5 (321), 19 (3432) | FI | 12 to 54 months | Lifestyle interventions showed no significant reductions in FI for PA (-7.61% 95% CI: -15.52 to 0.30), or diet (-13.73%, 95% CI: -28.64 to 1.18), but did find differences for diet + PA (-18.25% 95% CI: -24.18 to -12.32). | |
| Zhang et al. 2016 | Lifestyle intervention versus usual care stratified by only PA, only diet and diet + PA | PA only<br>Diet only<br>PA and diet | Sub group meta-analysis | 18 | 5 (233), 2 (282), 12 (2551) | HOMA-IR | 12 to 54 months | Lifestyle interventions showed no significant reductions in HOMA-IR for PA (-7.25% 95% CI: -19.02 to 4.51), but did find significant reductions for diet (-24.24%, 95% CI: -37.21 to -11.27), and diet + PA (-24.76%, 95% CI: -31.92 to -17.60). | |
| Cai et al. 2016 | Adding pedometer intervention to dietary counselling vs pedometer intervention | PA and diet<br>Diet only | Sub-group meta-analyses | 14 | 8 (1130) BMI<br>7 (805) Weight | BMI, weight | 6 to 48 weeks | Pedometer intervention alongside dietary counselling resulted in significant declines in<br>BMI (WMD -0.30 kg/m2, 95% CI: -0.50 to -0.10) and weight (WMD -0.86 kg, 95% CI: -1.45 to -0.27). Pedometer interventions alone had | Methodological quality of included RCTs was low to moderate. |

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| | alone. | | | | | | | no significant effects on BMI (WMD -0.09, 95%CI: -0.20 to 0.03) and weight (WMD -0.27, 95%CI: -1.06 to 0.52). | |
| Zhang et al. 2016 | Lifestyle intervention versus usual care stratified by only PA, only diet and diet + PA | PA only<br>Diet only<br>PA and diet | Sub group meta-analysis | 18 | 12 (1663), 6 (433), 31 (6632) | Weight | 12 to 54 months | Lifestyle interventions had largest reduction in weight when diet was targeted (-6.21 kg, 95% CI: -8.63 to -3.19), (followed by PA + diet (-4.12 kg, 95% CI: -4.93 to -3.30), followed by PA alone (-1.55 Kg, 95% CI: -2.53 to -0.57). | Small number of studies for diet and PA alone compared to diet + PA alone |
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| **2.4: Theoretical basis/main underlying model** | | | | | | | | | |
| **Study** | **Comparison** | **Target behaviors** | **Method of comparison** | **OQAQ** | **N studies (N participants)** | **Outcome** | **Follow up** | **Results** | **Comments/ Limitations** |
| Cradock et al. 2017 | Impact of stated theoretical basis on dietary intervention | Diet | Moderator analysis | 14 | 32 (nr) | HbA1c | 1 to 24 months | The use of a theoretical model or framework was non-significantly associated with a clinically meaningful reduction in HbA1c (0.33%, p=0.10). | |

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| | effectiveness | | | | | | | | |
| Odgers-Jewell et al. 2017 | Effectiveness of group based interventions based on a theoretical model vs no theoretical model | Positive self-management behaviors | Sub group meta-analyses | 18 | 24 (4316)<br><br>23 (2739) | HbA1c | 6 to 60 months | Group based interventions based on a theoretical model significantly reduced HbA1c compared to control (MD =-0.39% 95% CI: -0.65 to -0.12).<br><br>Group based interventions not based on a theoretical model significantly reduced HbA1c compared to control (MD = -0.27% 95% CI: -0.46 to -0.09). | |
| **2.5: Behaviour Change Techniques** | | | | | | | | | |
| **Study** | **Comparison** | **Target behaviors** | **Method of comparison** | **OQAQ** | **N studies (N participants)** | **Outcome** | **Follow up** | **Results** | **Comments/ Limitations** |
| *Self-monitoring (blood glucose)* | | | | | | | | | |
| Zhu et al. 2016 | SMBG with usual care vs. usual care | Monitoring of blood glucose | Meta-analysis | 16 | 18 (3383) | HbA1c | NR | SMBG interventions performed better than controls for HbA1c (MD −0.33, 95% CI −0.45 to −0.22). | Follow up period not reported. Measurement units not stated |
| Zhu et al. 2016 | SMBG with usual care vs. usual | Monitoring of blood glucose | Meta-analysis | 16 | 3 (1366) | FPG | NR | SMBG interventions did not perform better than control for FPG. | Follow up period not reported. Only 3 studies. |

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| | care | | | | | | | | |
| Zhu et al. 2016 | SMBG with usual care vs. usual care | Monitoring of blood glucose | Meta-analysis | 16 | 9 (1391) | BMI | NR | SMBG interventions performed better than controls for BMI (−0.65 kg/m2; −1.18 to −0.12). | Follow up period not reported |
| Zhu et al. 2016 | SMBG with usual care vs. usual care | Monitoring of blood glucose | Meta-analysis | 16 | 8 (1841) | Weight | NR | SMBG interventions did not perform better than control for weight. | Follow up period not reported |
| *Self-monitoring (PA)* | | | | | | | | | |
| Baskerville et al. 2017 | Self-monitoring of PA plus usual care (UC) or standardised intervention (SI) vs. UC (or SI) only | PA | Meta-analysis | 16 | 7 (182) | Weight or BMI | 1 to 18 months | Intervention did not reduce weight or BMI significantly more than controls (SMD = +0.10, 95% CI: -0.2 to 0.3). | Component studies mostly had a moderate risk of bias and the pooled sample size under-pinning the meta-analysis is low |
| Cai et al. 2016 | Pedometer based intervention vs no intervention (or dietary | PA | Meta-analysis | 14 | 8 (1130)<br><br>7 (805) | BMI<br><br>Weight | 6 to 48 weeks | Interventions significantly reduced BMI and weight.<br><br>BMI: Weighted Mean Diff -0.15 | Methodological quality of included RCTs was low to moderate. Effects were |

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| | advice + pedometer + vs dietary advice only) | | | | | | | kg/m2 (95%CI: -0.29 to -0.02).<br><br>Weight: Weighted Mean Diff -0.65 kg, (95% CI: -1.12 to -0.17). | concentrated in 2 studies. |
| Baskerville et al. 2017 | Self-monitoring of PA plus usual care (UC) or standardised intervention (SI) vs. UC (or SI) only | PA | Meta-analysis | 16 | 10 (1372) | PA | 1 to 18 months | Self-monitoring of PA increased PA (SMD 0.57, 95% CI 0.24, 0.91). | |
| *Other behaviour change techniques* | | | | | | | | | |
| Fu et al. 2016 | Carbohydrate counting on versus other diabetes diet method or usual diabetes dietary education | Diet | Meta-analysis | 16 | 10 (773) | HbA1c | NR | Carbohydrate counting was associated with a significant reduction in HbA1c compared to other diabetes diet method or usual diabetes dietary education (SMD = -0.35%, 95% CI: -0.65 to -0.05). | Duration of effects not reported |

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| Fu et al. 2016 | Carbohydrate counting on versus other diabetes diet method or usual diabetes dietary education | Diet | Meta-analysis | 16 | 3 (NR) | Hypoglycaemia events | NR | Carbohydrate counting was not associated with a reduction in hypoglycaemia events when compared to other diabetes diet method or usual diabetes dietary education (SMD = -0.14, 95% CI: -0.39 to 0.10). | Duration of effects not reported |
| Fu et al. 2016 | Carbohydrate counting on versus other diabetes diet method or usual diabetes dietary education | Diet | Meta-analysis | 16 | 3 (NR) | BMI | NR | Carbohydrate counting was not associated with a reduction in BMI when compared to other diabetes diet method or usual diabetes dietary education (SMD = -0.06, 95% CI: -0.39 to 0.28). | Duration of effects not reported |
| Ekong et al. 2016 | Intervention based on motivational interviewing vs control | Diet, PA, smoking or alcohol reduction | Descriptive analysis /counting of sig or non-sig results | 14 | 13 (nr) | HbA1c | 3-24 months | A significant difference for the MI group compared to control was reported in three of the thirteen studies reporting HbA1c. | Risk of bias in the component studies was moderate to high in most cases. Fidelity of intervention |

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| | | | | | | | | | delivery is cited as a factor likely to underlie the variation in outcomes. |
| Thepwongsa et al 2017 | MI versus control | Behaviours associated with type 2 diabetes | Descriptive | 16 | 8 (1930) | FPG, HbA1c, BMI, WC and physical activities | NR | Two thirds of the studies found a significant improvement in at least one of the patient outcomes. | No follow up stated. Lack of detail in narrative synthesis . |
| Ekong et al. 2016 | Intervention based on motivational interviewing vs control | Diet, PA, smoking or alcohol reduction | Descriptive analysis /counting of sig or non-sig results | 14 | 10 (nr) | BMI or weight | 3-24 months | A significant difference for the MI group compared to control was reported in two of the ten studies reporting these outcomes (1/2 for weight, 1/8 for BMI). | Risk of bias in the component studies was moderate to high in most cases. Fidelity of intervention delivery is cited as a factor likely to underlie the variation in outcomes. |
| Ekong et al. 2016 | Intervention based on motivational interviewing | Diet, PA, smoking or alcohol | Descriptive analysis /counting of sig or | 14 | 6 (nr) | PA (self-reported) | 3-24 months | No significant difference for the MI group compared to control was reported in any of the six studies | Risk of bias in the component studies was moderate to high |

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| | vs control | reduction | non-sig results | | | | | reporting physical activity. | in most cases. Fidelity of intervention delivery is cited as a factor likely to underlie the variation in outcomes. |
| Cradock et al. 2017 | Association of using specific BCTs on effectiveness of Dietary interventions | Diet | Moderator analyses | 14 | 54 (4496) | HbA1c | 1 to 24 months | Initial moderator analysis showed.<br><br>No were associated with >= 0.3% reduction in HbA1c.<br><br>Subgroup analysis using only "true" control groups showed that the BCTs "social comparison" (0.52%], P = 0.012) and "feedback on behavior" (0.365%], P = 0.046) were associated with clinically and statistically significant reductions in HbA1c.<br><br>Subgroup analysis of BCTs reporting outcome changes at 3 months showed that the BCT "problem solving" (0.63%) was associated with clinically significant reductions in HbA1c. | Analyses are highly exploratory. Multiple analyses may lead to spurious results. Effects of combinations of BCTs are hard to unpick. Reporting of intervention content was reported to be poor. |

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| | | | | | | | | Subgroup analysis of interventions aimed at changing behavior found the BCTs “feedback on behavior” (0.52%, P = 0.007) and “adding objects to the environment” (0.39%) were associated with clinically significant reductions in HbA1c.<br><br>Subgroup analysis of interventions aimed at changing the dietary environment found the BCT “problem solving” (0.5%) was associated with a clinically significant reduction in HbA1c. | |
| Cradock et al. 2017 | Providing food /meals (PF) (changing the food environment) vs other behaviour change (BC) techniques | Diet | Sub-group meta-analyses | 14 | PF: 17 (1271)<br><br>BC: 39 (3319) | HbA1c | 1 to 24 months | Providing food provided greater effects on HbA1c than using other BCTs.<br><br>PF: Mean Diff -0.50% (95%CI: -0.65 to -0.34).<br><br>BC: Mean Diff of -0.3%2 (95%CI: -0.40 to -0.23). | Differences may reflect differences in follow up time between sub-groups (these are not summarised). |
| Cai et al. | Pedometer intervention | PA | Sub-group meta- | 14 | 8 (1130) | BMI | 6 to 48 weeks | Interventions with or without step goals had similar effects on BMI | Not clear who set the step goals |

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| 2016 | with vs without step goals | | analyses | | | Weight | | (WMD with: -0.18, 95%CI: -0.41 to 0.05 vs WMD without -0.14, 95%CI: -0.34 to 0.06).<br><br>Interventions without step goals had slightly higher effects on weight (WMD with: -0.27, 95%CI: -1.06 to 0.52 vs WMD without -0.86, 95%CI: -1.45 to -0.27). | (i.e. patient or provider) and it seems counter-intuitive to have a pedometer-based intervention without this element, so this result may simply reflect lack of detail in intervention reporting. |
| Cui et al. 2016 | Mobile phone intervention compared to usual care stratified by presence or absence of feedback | Diabetes self-caret, inc. diet & PA | Sub-group meta-analyses | 15 | 6 (884) with<br><br>No data on k(N) was provided for studies without feedback | HbA1c | 3 to 12 months | The pooled effect size for HbA1c reduction for “mHealth with feedback” was statistically significant: -0.40% (95% CI -0.69 to -0.11%). For “mHealth without feedback,” the pooled effect size for HbA1c reduction was slightly larger, but not statistically significant: -0.46% (95% CI -1.19 to 0.26%). | It is hard to conclude anything from this as the effect sizes are similar and the “without feedback” analysis may have been under-powered. |

| 2.6: Intensity of intervention | | | | | | | | | |
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| **Study** | **Comparison** | **Target behaviors** | **Method of comparison** | **OQAQ** | **N studies (N participants)** | **Outcome** | **Follow up** | **Results** | **Comments/ Limitations** |
| Barry et al. 2017 | Effectiveness of diet and /or PA interventions lasting 6-24 months vs those lasting 36-72 months | Diet, PA | Sub-group meta-analyses | 16 | 25 (10,593) | Incidence of type 2 diabetes | 1 to 72 months | Lifestyle interventions lasting six months to two years reduced the relative risk of developing diabetes by 31% (95% CI: 15% to 44%). Lifestyle interventions lasting three to six years showed a 37% (28% to 46%) reduction in relative risk. The sub-group difference was not significant (p=0.47). | Although the risk-reduction is similar, as diabetes incidence increased over time, the Number Needed to Treat was substantially lower for longer interventions. NNT=12 (95%CI 10 to 15) vs 33 (23 to 67). |
| Baskerville et al. 2017 | Effectiveness of studies with longer intervention duration (>=12 months) vs shorter | PA | Sub-group meta-analyses | 16 | 10 (1372) | PA | 0-12<br><br>12-18 months | There were no differences between studies grouped by length of intervention of <12 months; SMD 0.51 (95% CI 0.11 to 1.13) vs 12 months or more; SMD 0.68 (95% CI 0.30 to 1.07. | Not clear if PA was measured objectively. Component studies mostly had a moderate risk of bias. Given high variance in |

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| | duration. | | | | | | | | measures of PA, this analysis is likely to be underpowered. |
| **2.7: Mode of delivery** | | | | | | | | | |
| **Study** | **Comparison** | **Target behaviors** | **Method of comparison** | **OQAQ** | **N studies (N participants)** | **Outcome** | **Follow up** | **Results** | **Comments/ Limitations** |
| *Digital delivery* | | | | | | | | | |
| Porter et al. 2016 | Mobile electronic devices, multi component diabetes management strategies versus usual care or alternative treatment models | Diabetes self-management, diet and PA | Descriptive | 17 | 9 (NR) | HbA1c, FPG, TG | 3 to 12 months | Significantly greater improvement in HbA1c in the intervention group compared to the control group in four of nine studies. | Not possible to attribute whether the effect (or lack of) on HbA1c was attributable to recording of food or nutrient intake using a mobile device.<br><br>Only narrative synthesis |
| Yasmin et al. | Short message | Self-manageme | Descriptive | 14 | 4 (490) | HbA1c | 3 to 12 months | 3 studies reported on clinical outcome; 2 on type 2 and 1 on type | |

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| 2016 | service and voice call interventions versus control | nt, diet and PA | | | | | | 1 Diabetes. No significant differences in the mean HbA1C value was found. | |
| Wang et al. 2017 | mHealth intervention versus control | Diet, PA and self-management | Descriptive | 14 | 10 (NR) | HbA1c | NR | 5 of 10 studies found that mHealth interventions resulted in significantly improved HbA1c. | No data on follow up period and only pre-post studies. |
| Cui et al. 2016 | Mobile phone app strategies compared to standard diabetes care | Diabetes self management | Meta-analysis | 15 | 6 (884) | HbA1c | 3 to 12 months | Mobile phone apps significantly reduced HbA1c by -0.40% (95% CI: -0.69 to -0.11) compared to standard diabetes care. | Substantial heterogeneity in the overall pooled effect (I2 = 77%) |
| Beishuizen et al. 2016 | Web-based intervention plus usual care (UC) vs UC (sometimes with minimal intervention) | Any combination of diet, PA, medication-use, glucose monitoring | Meta-analysis | 14 | 21 (6518) | HbA1c | 3-60 months (median 12 months) | Intervention significantly reduced HbA1c more than controls (Mean Diff –0.13%, 95% CI: –0.22 to –0.05). | |
| Arambepola | Mobile messaging | Diet, PA or | Meta- | 17 | 13(1155) | HbA1c | 2-12 months | Significant difference in HbA1c favouring intervention of -0.53% | Only a minority of the trials had |

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| et al. 2016 | plus usual care (UC) vs UC or UC+ minimal intervention | both | analysis | | | | (median 6 months) | (95%CI –0.59% to -0.47%). | low risk of bias |
| Mudaliar et al. 2016 | Lifestyle interventions delivered by community workers versus delivered by health professionals versus electronically delivered | Diet and PA | Sub-group meta-analysis | 16 | 21 (NR) | FPG | 3 to 36 months | No "statistically significant" differences in FPG were observed between different delivery modes.<br><br>Community workers (Mean diff = +1.78 mg/dl, 95%CI: -4.47 to 8.04).<br><br>Health professionals (Mean diff = -2.87 mg/dl, 95%CI: -4.34 to -1.40).<br><br>Electronic media (Mean diff = -3.08 mg/dl, 95%CI: -5.22 to -0.94). | "Significant differences" defined conservatively in terms of CI's not overlapping. CIs for community workers were very wide.<br><br>N of participants not reported |
| Sun et al. 2017 | Lifestyle intervention delivered in person versus by technology (e.g. mobile) | Diet and PA | Sub-group meta-analysis | 16 | NR (NR) | FPG | 6 months | Lifestyle interventions delivered in person reduced FPG (Mean Diff = -0.95 mg/dl, 95% CI: -2.71 to -0.80). Interventions delivered by technology produced no significant difference (-0.27 mg/dl, 95% CI: -0.87 to 0.34). | No data on N studies or participants |

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| Wang et al. 2017 | mHealth intervention versus control | Diet, PA and self-management | Descriptive | 14 | 14 (NR) | Weight | 1 to 24 months | 6 studies (43%) found that mHealth interventions produced higher reductions in weight loss or waist circumference than controls. | Only pre-post studies.<br><br>Only one study >12 months duration and no effect on weight at this time-point |
| Beishuizen et al. 2016 | Web-based intervention plus usual care (UC) vs UC (sometimes with minimal intervention) | Diet, PA or both | Meta-analysis | 14 | 17 (3713) | Weight | 3-30 months (median 12) | Intervention significantly reduced weight more than controls (Mean Diff –1.34 kg, 95% CI: –1.91 to –0.77). | |
| Cui et al. 2016 | Mobile phone app strategies compared to standard diabetes care | Diabetes self management, diet & PA | Meta-analysis | 15 | 4 (572) | Weight | 3 to 12 months | No significant reductions in weight for those using mHealth compared to standard diabetes care(effect size: -0.84 kg, 95% CI: -2.04 to 0.36 mmol/l, p = 0.17). | Low heterogeneity (I2 = 30%, p for heterogeneity = 0.23). |

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| Joiner et al. 2017 | DPP-based eHealth interventions on weight loss versus control or pre-post | Diet and PA | Meta-analysis | 15 | 22 (2097) | Weight | 3 to 15 months (mean = 3.8 months) | DPP-based eHealth interventions were associated with a mean % weight loss of -3.98% (95% CI: -4.49 to – 3.46). | |
| Aramb epola et al. 2016 | Mobile messaging plus usual care (UC) vs UC or UC+ minimal intervention | Diet, PA or both | Meta-analysis | 17 | 5 (406) | BMI | 3-7 months (median 6 months) | No significant difference in BMI between intervention and controls (Mean diff -0.25 kg/m2: 95%CI: -1.02 to 0.52). | Only a minority of the trials had low risk of bias |
| Mudali ar et al. 2016 | Lifestyle interventions delivered by community workers versus delivered by health professionals versus electronically delivered | Diet and PA | Sub-group meta-analysis | 16 | 16 (NR) | Weight | 3 to 36 months | No “statistically significant” differences in FPG were observed between different delivery modes.<br>Community workers (Mean diff = -3.13 kg, 95%CI: -4.66 to -1.59).<br>Health professionals (Mean diff = -3.77 kg, 95%CI: -4.66 to -2.88).<br>Electronic media (Mean diff = -5.02 | “Significant differences” defined conservatively in terms of CI’s not overlapping.<br>N of participants not reported<br>Follow up times |

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| | | | | | | | | kg, 95%CI: -5.72 to -4.32). | not taken into account (may be shorter for digital interventions), nor were attrition rates (which tend to be higher in digital trials) |
| Sun et al. 2017 | Lifestyle intervention delivered in person versus by technology (e.g. mobile) | Diet and PA | Sub-group meta-analysis | 16 | Tech 8 (NR)<br>In-person 31 (NR) | Weight | 3 months, 6 months, 12 months | Lifestyle interventions delivered in person and by technology both reduced weight at 3 months (In person SMD = - 0.22, 95% CI: -0.28 to -0.15) (Tech SMD = -0.32 95% CI: -0.50 to -0.13) and 6 months (In person SMD = -0.88, 95% CI: -1.21 to -0.55) (Tech SMD = -0.92, 95% CI: -1.68 to -0.15). However at 12 months larger reductions were observed for technology (SMD -0.63, 95% CI: -0.97 to -0.29) than for in person delivery (SMD -0.15, 95% CI: -0.22 to -0.08). | No data on N participants |
| Joiner et al. 2017 | Effects of DPP-based eHealth interventions | Diet and PA | Sub-group meta-analysis | 15 | 9 (822)<br>9 (861) | Weight | 3 to 15 months (mean = 3.8 | Interventions which were standalone significantly reduced weight (Mean Diff -3.34%, 95% CI: -4.00 to – 2.86). | |

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| | stratified by a) standalone b) supported remotely c) face to face | | | | 7 (414) | | months) | Interventions which were supported remotely significantly reduced weight (Mean Diff -4.31%, 95% CI: -5.26 to – 3.37).<br><br>Interventions which were supported face to face significantly reduced weight (Mean Diff -4.65%, 95% CI: -6.63 to – 2.67). | |
| Beishuizen et al. 2016 | Effectiveness of interventions delivered by internet alone vs internet + clinician (blended intervention) | Multiple CV prevention behaviours (inc diet, PA, glucose monitoring, medication use) | Sub-group meta-analyses | 14 | 26 (7538) blended<br><br>14 (428) internet-only | SMD (Hedge's g) used to pool primary outcome measures: (SBP; HbA1c; weight; PA; CV composite | 3-60 months (median 12) | The intervention effect was more pronounced in the sample of blended studies (SMD –0.33, 95% CI: –0.43 to –0.22) compared to the sample of Internet-only studies (SMD –0.15, 95% CI: –0.23 to –0.07). | |

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| | | | | | | score) | | | |
| Beishuizen et al. 2016 | Web-based intervention plus usual care (UC) vs UC (sometimes with minimal intervention) | PA | Meta-analysis | 14 | 14 (4444) | PA (SMD used to pool different outcome measures) | 3-16 months (median 7.5) | Intervention significantly increased PA more than controls (SMD 0.25, 95% CI: 0.10 to 0.39). | Most studies used self-reported PA from questionnaires (8) or pedometer diaries (5). |
| Cui et al. 2016 | Mobile phone app strategies compared to standard diabetes care | Diabetes self management, diet & PA | Meta-analysis | 15 | 1 (199) | PA | 4 months | Mobile phone app strategies were associated with a significant increase in PA when compared to the usual care group (MD = 11.73, 95% CI 6.21 to 17.25; P<0.001). | No units of PA mentioned |
| *Group based or individual (one to one) delivery* | | | | | | | | | |
| Odgers-Jewell et al. 2017 | Group based interventions vs control | Positive self-management behaviors | Meta-analysis | 18 | 47 (7055), 30 (4107), 27 (4384), 3 (194), 8 (1106) & 5 (1436) | HbA1c | 6 to 60 months, 6 – 10 months, 12 to 14 months, 18 months,24 months | Group based interventions significantly reduced HbA1c when compared to control at 6 to 60 months (- 0.3% (4 mmol/mol) 95% CI: -0.51 to -0.17, P < 0.0001), 6 to 10 months (-0.3% (3 mmol/mol), 95% CI: -0.48 to -0.15, P = 0.0002) 12 to 14 months (-0.3% (4 mmol/mol), 95% CI: -0.49 to -0.17, P < 0.0001), | The highest heterogeneity was at 24 months |

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| | | | | | | | & 36 to 48 months | 18 months (-0.7% (8 mmol/mol), 95% CI: -1.26 to -0.18, P < 0.009) & 36 to 48 months (-0.9% (10 mmol/mol), 95% CI: -1.52 to -0.34, P = 0.002) but not at 24 months. | |
| Odgers-Jewell et al. 2017 | Group based interventions vs control | Type 2 diabetes self-management behaviors | Meta-analysis | 18 | 10 (915), 8 (1071), 4 (413) | FPG | 6 to 10 months, 12 to 14 months, 24 months | Group based interventions significantly reduced FPG when compared to control at 12 to 14 months (- 0.68 mmol/l 95% CI: -1.25 to -0.11, P = 0.02) but not at 24 months. | |
| Odgers-Jewell et al. 2017 | Group based interventions vs control | Type 2 diabetes self-management behaviors | Meta-analysis | 18 | 17 (2513), 9 (1564), 4 (1319) | Weight | 6 to 10 months, 12 to 14 months, 36 to 48 months | Group based interventions significantly reduced weight when compared to control at 6 to 10 months (- 1.22 kg 95% CI: -2.22 to -0.23, P = 0.02) and 12 to 14 months (- 1.43 kg 95% CI: -2.09 to -0.77, P < 0.0001) but not at 36 to 48 months. | |
| Odgers-Jewell et al. 2017 | Group based interventions vs control | Type 2 diabetes self-management behaviors | Meta-analysis | 18 | 18 (2035), 13 (2044), 6 (998) | BMI | 6 to 10 months, 12 to 14 months, 24 months | Group based interventions did not significantly reduce BMI at 6 to 10 months, 12 to 14 months or 24 months. | |

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| Odgers-Jewell et al. 2017 | Group based interventions vs control | Type 2 diabetes self-management behaviors | Meta-analysis | 18 | 5 (986), 3 (1088) | WC | 6 to 10 months, 12 to 14 months | Group based interventions significantly reduced WC when compared to control at 6 to 10 months (MD = - 1.19 cm, 95% CI: -2.34 to -0.05, P = 0.04 but not at 12 to 14 months. | |
| **2.8: Population characteristics (i.e. demographic and clinical characteristics)** | | | | | | | | | |
| **Study** | **Comparison** | **Target behaviors** | **Method of comparison** | **OQAQ** | **N studies (N participants)** | **Outcome** | **Follow up** | **Results** | **Comments/ Limitations** |
| *Demographics* | | | | | | | | | |
| Arambepola et al. 2016 | Effectiveness of mobile messaging intervention in High vs Low-to-Middle Income countries | Diet, PA or both | Descriptive (proportion of effective interventions)<br><br>Sub-group meta-analysis | 17 | 13(1155) | HbA1c or other clinical outcomes | 2-12 months (median 6 months) | 100% of interventions were effective in LMICs vs 55% in HICs.<br><br>Similar (and significant) improvements in HbA1c favouring intervention found in LMIC (Mean diff -0.53 kg/m2: 95%CI: -0.69 to -0.37) and HIC (Mean diff -0.53: 95%CI -0.60 to -0.47). | Only a minority of the trials had low risk of bias |
| Zhu et al. 2016 | Effects of SMBG interventions versus | Monitoring of blood glucose | Sub-group meta-analysis | 16 | NR | HbA1c, FPG, BMI; weight | NR | SMBG significantly improved HbA1c levels and BMI regardless of the groups. No evidence of improvements were found in weight. | |

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| | control stratified by Asian populations & populations from America and Europe | | | | | | | | |
| Cai et al. 2016 | Association of age, gender, baseline BMI baseline PA on the effectiveness of pedometer based interventions | PA | Meta-regression | 14 | 8 (nr)<br>7 (nr)<br>8 (nr)<br>6 (nr) | BMI, Weight | 6 to 48 weeks | No significant associations were found between age, gender, baseline BMI, or baseline PA on intervention effectiveness. | The overall effect size was low, so meta-regression with such a small number of studies is unlikely to be well-powered. Component RCTs were of low to moderate quality. |
| Beishuizen et al. 2016 | Studies with populations of relatively low age (not all participants | Multiple CV prevention behaviours (inc diet, PA, glucose monitoring, | Sub-group meta-analyses | 14 | 33 (nr)<br>29 (nr) not all over 50 | SMD (Hedge's g) used to pool primary outcome | 3-60 months (median 12) | The pooled effect size was larger for older participants (SMD –0.30, 95%CI: -0.51 to -0.09) than for studies with relatively younger participants (SMD –0.23, 95%CI: -0.33 to -0.14). | Confidence intervals largely overlapped |

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| | older than 50 years) vs. older age (all older than 50 years) | medication use) | | | 4 (nr) all over 50 | measures: (SBP; HbA1c; weight; PA; CV composite score) | | | |
| *Glycaemic status /duration of hyperglycemia* | | | | | | | | | |
| Cui et al. 2016 | Mobile phone app effectiveness stratified by HbA1c < 8% | Diabetes self management, diet & PA | Sub-group meta-analyses | 15 | 4 (696) | HbA1c | 3 to 12 months | For patients with HbA1c > 8% at baseline, there was no significant difference between the intervention group and control group (p = 0.33). For the subgroup with baseline HbA1c < 8% there was a significant reduction in HbA1c (MD -0.33% 95%CI: -0.59 to -0.06%. | |
| Daly et al. 2017 | Nurse led intervention effectiveness stratified by HbA1c < 8% or HbA1c ≥ 8% | Lifestyle changes, medication adherence | Sub-group meta-analyses | 14 | 36 (6920) Sub group figures = 14 (NR), 22 (NR) | HbA1c | 3 months to 5 years | For patients with baseline HbA1c of <8% the MD was-0.12% (95% CI: -0.24 to 0.00).<br><br>For people with a baseline of > 8 HbA1c the MD was -0.48% (95% CI: -0.65 to -0.30). | |
| Zhang et al. | Lifestyle intervention versus | Diet and PA | Sub-group meta- | 18 | 2 (246)<br><br>11 (2940) | HbA1c | 12 to 54 months | Lifestyle interventions were associated with significantly reduced HbA1c versus control for people with | |

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| 2016 | control stratified by FPG <5.5 mmol/L or HbA1c <5.5% and FPG ≥5.5 mmol/L or HbA1c ≥5.5% | | analysis | | | | | lower baseline FPG or HbA1c (MD -0.07%, 95% CI: -0.14 to -0.01). Similar reductions were found for people with higher baseline FPG or HbA1c (MD -0.05%, 95% CI:-0.09 to -0.02). | |
| Zhang et al. 2016 | Lifestyle intervention versus control stratified by FPG <5.5 mmol/L or HbA1c <5.5% and FPG ≥5.5 mmol/L or HbA1c ≥5.5% | Diet and PA | Sub-group meta-analysis | 18 | 24 (4383), 31 (4941) | FPG | 12 to 54 months | Lifestyle interventions were associated with significantly reduced FPG versus control for people with lower baseline FPG or HbA1c (-0.09mmol/L 95% CI: -0.13 to -0.05). Slightly larger reductions were found for people with higher baseline FPG or HbA1c (-0.18 mmol/L, 95% CI:-0.25 to -0.11). | |
| Zhang et al. 2016 | Lifestyle intervention versus control stratified by FPG <5.5 | Diet and PA | Sub-group meta-analysis | 18 | 12 (1551))<br>21 (3747) | FI | 12 to 54 months | Lifestyle interventions were associated with significantly reduced FI versus control for people with lower baseline FPG or HbA1c -11.69 %, 95% CI: -16.99 to -6.38). Slightly larger reductions were found for | |

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| | mmol/L or HbA1c <5.5% and FPG ≥5.5 mmol/L or HbA1c ≥5.5% | | | | | | | people with higher baseline FPG or HbA1c (-16.56 %, 95% CI:-23.14 to -9.98). | |
| Zhang et al. 2016 | Lifestyle intervention versus control stratified by FPG <5.5 mmol/L or HbA1c <5.5% and FPG ≥5.5 mmol/L or HbA1c ≥5.5% | Diet and PA | Sub-group meta-analysis | 18 | 6 (957)<br>14 (2009) | HOMA-IR | 12 to 54 months | Lifestyle interventions were associated with significantly reduced HOMA-IR versus control for people with lower baseline FPG or HbA1c (MD -14.68, 95% CI: -25.20 to -4.17). Larger reductions were found for people with higher baseline FPG or HbA1c (MD -28.05, 95% CI:-35.43 to -20.67). | |
| Zhang et al. 2016 | Lifestyle intervention versus control stratified by FPG <5.5 mmol/L or HbA1c <5.5% and FPG ≥5.5 | Diet and PA | Sub-group meta-analysis | 18 | 19 (3285)<br>30 (5443) | Weight kg | 12 to 54 months | Lifestyle interventions were associated with significantly reduced weight versus control for people with lower baseline FPG or HbA1c -4.20%, 95%CI: -5.14 to -3.27). Slightly smaller reductions were found for people with higher baseline FPG or HbA1c (-3.63, 95% CI:-4.75 to -2.52). | |

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| | mmol/L or HbA1c ≥5.5% | | | | | | | | |
| Daly et al. 2017 | Nurse led intervention versus usual care stratified by diabetes diagnosis for <10 years or ≥ 10 years | Lifestyle changes, medication adherence | Sub-group meta-analyses | 14 | 26 (NR) Sub-group figures = 15 (NR), 15 (NR) | HbA1c | 3 months to 5 years | The mean difference for trials with patients who had a diagnosis of diabetes for <10 years HbA1c was -0.28% (95% CI: -0.48 to -0.08, p = 0.005) compared with -0.55% (95% CI: -0.82 to -0.27, p = 0.0001) for people with a diagnosis of ≥ 10 years. | |
| Zhu et al. 2016 | Effects of SMBG interventions versus control stratified by Late versus early stage of diabetes | Monitoring of blood glucose | Sub-group meta-analysis | 16 | NR<br><br>NR | HbA1c, FPG, BMI; TGs, WC and weight | NR | The SMBG group outperformed the control group for HbA1c, BMI and TC, indicating that SMBG was effective in controlling blood glucose in the later phase of diabetes. | Only two trials with three sub studies were conducted in newly diagnosed patients but were not reported. |
| Basker ville et al. 2017 | Effectiveness of PA self-monitoring devices for people with shorter or | PA | Sub-group meta-analysis | 16 | 10 (1372) | PA | 1 to 18 months | Analysis suggested a possible increased effect in diabetes diagnosed within 5 years (SMD 0.82, 95% CI: 0.11 to 1.54) compared with people having diabetes for over 5 years (SMD 0.58, 95% CI: -0.12 to | Not clear if PA was measured objectively. Component studies mostly had a moderate |

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| | longer duration of diabetes | | | | | | | 1.28). | risk of bias. |
| **2.9: Provider** | | | | | | | | | |
| **Study** | **Comparison** | **Target behaviors** | **Method of comparison** | **OQAQ** | **N studies (N participants)** | **Outcome** | **Follow up** | **Results** | **Comments/ Limitations** |
| *Dietitians vs other providers* | | | | | | | | | |
| Moller et al. 2017 | Dietitian provided vs GP/nurse provided dietary advice | Diet | Meta-analysis | 15 | 5 (912) | HbA1c | 6 or 12 months | Nutrition therapy interventions significantly reduced HbA1c by 0.45% (95% CI: 0.36 to 0.53) compared to standard dietary advice. | Evidence was consider low quality by study authors |
| Sun et al. 2017 | Lifestyle intervention vs control stratified by dietitian versus non-dietitian | Diet and PA | Sub-group meta-analysis | 16 | NR (NR) | HbA1c | 12 months | Dietitian-delivered programs produced greater effect size for HbA1c than non-dietitian delivered programs at 12 months. Hedges' g: -0.43 (95% CI: -0.70 to -0.16) for programs delivered by dietitian and -0.26 (95% CI: -0.55 to 0.03 for those delivered by non-dietitians. | No data on N studies or participants |
| Cradock et al. | Impact of dietitian /nutritionist | Diet | Moderator analyses | 14 | 32 (NR) | HbA1c | 1 to 24 months | Contact with a dietitian /nutritionist was significantly associated with a | |

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| 2017 | contact on dietary intervention effectiveness | | | | | | | reduction in HbA1c (0.28%, p=0.04). | |
| Sun et al. 2017 | Lifestyle intervention vs control stratified by dietitian versus non-dietitian | Diet and PA | Sub-group meta-analysis | 16 | NR (NR) | FPG | 3 months<br><br>6 months<br><br>12 months<br><br>13-60 months | Dietitian-delivered programs produced greater effect size for FPG than non-dietitian delivered.<br><br>programs at 6, 12 and 13-60 months, but not at 3 months.<br><br>3 months: Hedge's g: -0.34 (95% CI: -0.54 to -0.14 vs -0.18 (95% CI: -0.44 to 0.07).<br><br>6 months: Hedge's g: -1.81 (95% CI: -5.78 to -2.16 vs -0.47 (95% CI: -0.78 to -0.15).<br><br>12 months: Hedge's g: -0.42 (95% CI: -0.70 to -0.14 vs -0.17 (95% CI: -0.37 to 0.04). | No data on N studies or participants |

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| | | | | | | | | 13-60 months: Hedge's g: -0.21 (95% CI: -0.29 to -0.12 vs 0.04 (95% CI: -0.07 to 0.15). | |
| Sun et al. 2017 | Lifestyle intervention vs control stratified by dietitian versus non-dietitian | Diet and PA | Sub-group meta-analysis | 16 | NR (NR) | 2-h BG | 6 months<br><br>12 months<br><br>13-60 months | Dietitian-delivered programs produced greater effect size for 2-hr BG than non-dietitian delivered.<br><br>programs at 12 and 13-60 months, but not at 6 months.<br><br>6 months: Hedge's g: 0.06 (95% CI: -0.08 to 0.20 vs -0.22 (95% CI: -0.42 to -0.01).<br><br>12 months: Hedge's g: -0.44 (95% CI: -0.51 to -0.38 vs -0.09 (95% CI: -0.22 to 0.05).<br><br>13-60 months: Hedge's g: -0.13 (95% CI: -0.23 to -0.04 vs 0.02 (95% CI: -0.09 to 0.12). | No data on N studies or participants |
| Moller | Dietitian | Diet | Meta- | 15 | 3 (611) | Weight | 6 or 12 | Nutrition therapy interventions | Evidence was |

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| et al. 2017 | provided vs GP/nurse provided dietary advice | | analysis | | | | months | significantly reduced weight by 2.06 kg (95% CI: 2.94 to 1.18) compared to standard dietary advice | consider medium quality by study authors |
| Sun et al. 2017 | Lifestyle intervention vs control stratified by dietitian versus non-dietitian | Diet and PA | Sub-group meta-analysis | 16 | NR (NR) | Weight | 3 months<br><br>6 months<br><br>12 months<br><br>13-60 months | Dietitian-delivered programs produced greater effect size for weight than non-dietitian delivered.<br><br>programs at 6 and 13-60 months and a similar effect at 3 and 12 months.<br><br>3 months: Hedge's g: -0.26 (95% CI: -0.34 to -0.18 vs -0.20 (95% CI: -0.28 to 0.12).<br><br>6 months: Hedge's g: -0.99 (95% CI: -2.11 to 0.12 vs -0.28 (95% CI: -0.36 to -0.19).<br><br>12 months: Hedge's g: -0.30 (95% CI: -0.40 to -0.21 vs -0.26 (95% CI: -0.34 to -0.18). | No data on N |

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| | | | | | | | | 13-60 months: Hedge's g: -0.24 (95% CI: -0.44 to -0.04 vs 0.04 (95% CI: -0.08 to -0.01). | |
| Moller et al. 2017 | Dietitian provided vs GP/nurse provided dietary advice | Diet | Meta-analysis | 15 | 4 (764) | BMI | 6 or 12 months | Nutrition therapy interventions significantly reduced BMI by 0.55 $kg/m^2$ (95% CI: 1.07 to 0.02) compared to standard dietary advice. | Evidence was consider low quality by study authors |
| *Other providers* | | | | | | | | | |
| Odgers-Jewell et al. 2017 | Group based interventions which were peer led vs control | Positive self-management behaviors | Sub-group meta-analysis | 18 | 5 (1066) | HbA1c | 6 to 60 months | Group based interventions which were peer led showed no significant reduction in HbA1c when compared to control. Mean Diff: 0.02% (95%CI: -0.12 to 0.16). | |
| Odgers-Jewell et al. 2017 | Group based interventions led by health professional versus control | Positive self-management behaviors | Sub-group meta-analysis | 18 | 5 (1019) | HbA1c | 6 to 60 months | Group based interventions which were led by health professionals showed significantly reduced HbA1c compared to control (-0.27, 95% CI:-0.48 to -0.06). | |
| Odgers-Jewell | Group based interventions | Positive self- | Sub-group meta- | 18 | 17 (2134) | HbA1c | 6 to 60 | Group based interventions which were led by a single disciplinary | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| et al. 2017 | delivered by a single disciplinary team versus control | management behaviors | analysis | | | | months | team showed significantly reduced HbA1c compared to control (-0.56, 95% CI:-0.86 to -0.26). | |
| Odgers-Jewell et al. 2017 | Group based interventions delivered by a multi-disciplinary team Multidisciplinary team versus control | Positive self-management behaviors | Sub-group meta-analysis | 18 | 20 (2836) | HbA1c | 6 to 60 months | Group based interventions which were led by a multidisciplinary disciplinary team showed significantly reduced HbA1c compared to control (-0.24, 95% CI:-0.43 to -0.04). | |
| Pousinho et al. 2016 | Pharmacist delivered versus usual care | Self-management | Descriptive | 17 | 26 (NR) | HbA1c | 45 days to 24 months | 24/26 studies reported a greater improvement in HbA1c for the intervention group compared with controls. The difference in A1c change ranged from -0.18% to -2.1%. 15 studies reported a *significant* difference in HbA1c change between the 2 groups. | 1 study, found a significant difference between groups for baseline A1c and the appropriate statistical adjustment was not conducted |
| Pousinho et | Pharmacist delivered | Self-manageme | Descriptive | 17 | 23 (NR) | Mixed blood | 45 days to 24 | 20/23 studies reported a greater improvement in blood glucose in the | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| al. 2016 | versus usual care | nt | | | | glucose measures (fasting, postprandial, random) | months | intervention group compared with controls. The difference in change between both groups ranged from -5.9 mg dL-1 to -66.87 mg dL-1 and was statistically *significant* in 5/23 studies. | |
| Pousinho et al. 2016 | Pharmacist delivered versus usual care | Self-management | Descriptive | 17 | 14 (NR) | BMI | 45 days to 24 months | 12/14 studies reported a greater reduction in BMI in the intervention group compared with controls. Only 1/14 studies revealed a statistically significant difference. The difference in change between the 2 groups ranged from +0.4 kg m-2 to -2.77 kg $m^{-2}$. | |
| Daly et al. 2017 | Nurse led intervention versus usual care | Lifestyle changes, medication adherence | Meta-analysis | 14 | 36 (6920) | HbA1c | 3 months to 5 years | The was a small but significant reduction in HbA1c for nurse led interventions compared to usual care (-0.28%, 95% CI: -0.38% to -0.18%, p < 0.0001). | Hight heterogeneity (I2 = 68%, p < 0.0001) |
| Daly et al. 2017 | Nurse led intervention versus usual care | Lifestyle changes, medication adherence | Meta-analysis | 14 | 12 (1944) | BMI | 3 months to 5 years | The was no significant reduction in BMI for nurse led interventions compared to usual care (-0.05; 95% CI: -0.51 to 0.42, p < 0.84). | |