

## **Supplementary digital content**

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SDC 5. Subgroup analysis of effect of control characteristics on systolic blood pressure outcome

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SDC 1. Search Strategy

MEDLINE (Ovid) search strategy

1. hypertension/ or essential hypertension/
2. (blood pressure or hypertens\*).ti,ab.
3. 1 or 2 or 3
4. cell phone/ or text messaging/
5. software/ or mobile applications/ or user-computer interface/ or web browser/
6. computers, handheld/ or smartphone/
7. Videoconferencing/
8. exp Internet/
9. Social Media/
10. electronic mail/ or telemedicine/ or remote consultation/ or telepathology/ or telerehabilitation/
11. social networking/ or online social networking/
12. wearable electronic devices/ or fitness trackers/
13. (text messag\* or sms or short messag\* service\*).ti,ab.

14. (telephone or phone or mobile phone or cell phone or cellphone or smartphone or smart phone or i-phone or iphone or i-pad or ipad or app or apps or mobile application\*).ti,ab.
15. (mobile health or mobile technolog\* or mhealth).ti,ab.
16. (email or e-mail or electronic mail or web\* or website\* or web site\* or internet or online).ti,ab.
17. ((digital or electronic or technol\* or computer) adj5 (based or intervention or deliver\*)).ti,ab.
18. (laptop or computer).ti,ab.
19. (wearable adj3 (device or technolog\* or monitor or tracker or sensor)).ti,ab.
20. (fitbit or fit bit or pedometer or accelerometer or fitness tracker).ti,ab.
21. exp Exercise/
22. exercise therapy/ or endurance training/ or plyometric exercise/ or resistance training/
23. exp Diet Therapy/
24. Nutrition Therapy/
25. exp Drinking Behavior/
26. Diet, Sodium-Restricted/
27. sodium, dietary/ or sodium chloride, dietary/
28. health behavior/ or smoking cessation/ or smoking reduction/ or "tobacco use cessation"/

29. health promotion/ or healthy people programs/ or weight reduction programs/
30. risk reduction behavior/
31. Preventive Medicine/
32. (exercise or physical activity or sport\* or walk\* or running or jog\* or swimming or cycling).ti,ab.
33. Patient Education as Topic/
34. (exercise\* adj3 (intervention or therapy or program\* or train\*)).ti,ab.
35. (physical adj3 (endurance or education or fitness or activit\* or train\*)).ti,ab.
36. ((diet\* or food) adj3 (intervention\* or modif\*)).ti,ab.
37. (health\* adj2 eating).ti,ab.
38. dieting.ti,ab.
39. (nutrition\* adj3 (counselling or counseling or therapy)).ti,ab.
40. (weight train\* or weight reduction or weight loss program\*).ti,ab.
41. (weight adj3 (loss or reduc\* or decreas\* or change\* or control\* or manage\*)).ti,ab.
42. ((BMI or body mass index) adj3 (loss or reduc\* or decreas\* or change\* or control\*)).ti,ab.
43. ((alcohol or drink) adj3 (reduc\* or decrease\* or chang\*)).ti,ab.

44. alcohol.ti.

45. ((salt or sodium) adj3 (low or reduc\* or restrict or chang\* or decrease or diet\*)).ti,ab.

46. (health\* adj3 behavio?r\*).ti,ab.

47. ((behavio?r\* or lifestyle) adj3 (chang\* or modif\* or therapy or therapies or program\* or intervention\* or counsel\* or advice)).ti,ab.

48. (self-management or self management).ti,ab.

49. ((cigarette\* or smoking or tobacco) adj3 (reduc\* or quit\* or cessation or decreas\*)).ti,ab.

50. 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21

51. 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44  
or 45 or 46 or 47 or 48 or 49 or 50

52. randomized controlled trial.pt.

53. controlled clinical trial.pt.

54. randomized.ab.

55. placebo.ab.

56. drug therapy.fs.

57. randomly.ab.

58. groups.ab.

59. (trial or multicenter or multi center or multicentre or multi centre).ti,ab.

60. multicenter study.pt.

61. pragmatic clinical trial.pt.

62. (intervention? or effect? or impact? or controlled or control group? or (before adj5 after) or (pre adj5 post) or ((pretest or pre test) and (posttest or post test)) or quasiexperiment\* or quasi experiment\* or evaluat\* or time series or time point? or repeated measur\* or ((feasibility or pilot) adj (study or project\*))).ti,ab.

63. 53 or 54 or 55 or 56 or 57 or 58 or 59 or 60 or 61 or 62 or 63

64. exp animals/ not humans/

65. 64 not 65

66. 4 and 51 and 52 and 66

67. limit 67 to yr="2000 -Current"

#### Embase search strategy

1. blood pressure/ or arterial pressure/ or blood pressure fluctuation/ or blood pressure regulation/ or diastolic blood pressure/ or systolic blood pressure/
2. hypertension/ or elevated blood pressure/ or borderline hypertension/ or essential hypertension/ or prehypertension/ or systolic hypertension/

3. (blood pressure or hypertens\*).ti,ab.
4. 1 or 2 or 3
5. mobile phone/ or smartphone/
6. exp mobile application/
7. text messaging/
8. web browser/
9. computer interface/ or information technology device/
10. tablet computer/
11. computer assisted therapy/
12. telephone/
13. smartphone/
14. videoconferencing/
15. exp internet/
16. e-mail/
17. telemedicine/ or telehealth/ or teleconsultation/ or telemonitoring/ or telepathology/ or telerehabilitation/

18. social media/
19. blogging/
20. webcast/
21. electronic device/
22. (text messag\* or sms or short messag\* service\*).ti,ab.
23. (telephone or phone or mobile phone or cell phone or cellphone or smartphone or smart phone or i-phone or iphone or i-pad or ipad or app or apps or mobile application\*).ti,ab.
24. (mobile health or mobile technolog\* or mhealth).ti,ab.
25. (email or e-mail or electronic mail or web\* or website\* or web site\* or internet or online).ti,ab.
26. ((digital or electronic or technol\* or computer) adj5 (based or intervention or deliver\*)).ti,ab.
27. (laptop or computer).ti,ab.
28. (wearable adj3 (device or technolog\* or monitor or tracker or sensor)).ti,ab.
29. (fitbit or fit bit or pedometer or accelerometer or fitness tracker).ti,ab.
30. exp exercise/
31. kinesiotherapy/

32. exp diet/
33. diet therapy/ or dash diet/ or diabetic diet/ or diet restriction/ or low calorie diet/ or low fat diet/ or low glycemic index diet/
34. alcohol consumption/
35. drinking behavior/
36. sodium restriction/
37. exp health behavior/
38. smoking cessation/ or smoking cessation program/
39. health promotion/
40. exp body weight loss/
41. exp risk reduction/
42. preventive medicine/
43. exp patient education/
44. (exercise or physical activity or sport\* or walk\* or running or jog\* or swimming or cycling).ti,ab.
45. (exercise\* adj3 (intervention or therapy or program\* or train\*)).ti,ab.
46. (physical adj3 (endurance or education or fitness or activit\* or train\*)).ti,ab.

47. ((diet\* or food) adj3 (intervention\* or modif\*)).ti,ab.
48. (health\* adj2 eating).ti,ab.
49. dieting.ti,ab.
50. (nutrition\* adj3 (counselling or counseling or therapy)).ti,ab.
51. (weight train\* or weight reduction or weight loss program\*).ti,ab.
52. (weight adj3 (loss or reduc\* or decreas\* or change\* or control\* or manage\*)).ti,ab.
53. ((BMI or body mass index) adj3 (loss or reduc\* or decreas\* or change\* or control\*)).ti,ab.
54. ((alcohol or drink) adj3 (reduc\* or decrease\* or chang\*)).ti,ab.
55. alcohol.ti.
56. ((salt or sodium) adj3 (low or reduc\* or restrict or chang\* or decrease or diet\*)).ti,ab.
57. (health\* adj3 behavio?r\*).ti,ab.
58. ((behavio?r\* or lifestyle) adj3 (chang\* or modif\* or therapy or therapies or program\* or intervention\* or counsel\* or advice)).ti,ab.
59. (self-management or self management).ti,ab.
60. 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29

61. 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45 or 46 or 47 or 48 or 49 or 50 or 51 or 52 or 53 or 54 or 55 or 56 or 57 or 58 or 59

62. exp controlled clinical trial/ or pretest posttest control group design/

63. single blind procedure/ or double blind procedure/

64. crossover procedure/

65. intervention study/

66. multicenter study/

67. (random or ((singl\* or doubl\*) adj (blind\* or mask\*)) or crossover or cross over or factorial\* or latin square or assign\* or allocat\* or volunteer\*).ti,ab.

68. (trial or multicenter or multi center or multicentre or multi centre).ti,ab.

69. (intervention? or effect? or impact? or controlled or control group? or (before adj5 after) or (pre adj5 post) or ((pretest or pre test) and (posttest or post test)) or quasiexperiment\* or quasi experiment\* or evaluat\* or time series or time point? or repeated measur\* or ((feasibility or pilot) adj (study or project\*))).ti,ab.

70. 62 or 63 or 64 or 65 or 66 or 67 or 68 or 69

71. (exp animals/ or nonhuman/) not human/

72. 70 not 71

73. 4 and 60 and 61 and 72

74. limit 73 to yr="2000 -Current"

75. limit 74 to conference abstracts

76. 74 not 75

#### CENTRAL search strategy

1. MeSH descriptor: [Blood Pressure] explode all trees
2. MeSH descriptor: [Hypertension] this term only
3. MeSH descriptor: [Essential Hypertension] explode all trees
4. MeSH descriptor: [Prehypertension] explode all trees
5. #1 or #2 or #3 or #4
6. MeSH descriptor: [Cell Phone] explode all trees
7. MeSH descriptor: [Cell Phone Use] this term only
8. MeSH descriptor: [Smartphone] explode all trees
9. MeSH descriptor: [Mobile Applications] this term only
10. MeSH descriptor: [User-Computer Interface] this term only

11. MeSH descriptor: [Web Browser] this term only
12. MeSH descriptor: [Computers, Handheld] this term only
13. MeSH descriptor: [Videoconferencing] this term only
14. MeSH descriptor: [Internet] explode all trees
15. MeSH descriptor: [Social Media] this term only
16. MeSH descriptor: [Text Messaging] this term only
17. MeSH descriptor: [Electronic Mail] this term only
18. MeSH descriptor: [Social Networking] this term only
19. MeSH descriptor: [Online Social Networking] this term only
20. MeSH descriptor: [Wearable Electronic Devices] this term only
21. MeSH descriptor: [Fitness Trackers] this term only
22. ((text messag\* or sms or short messag\* service\*)):ti,ab,kw OR ((telephone or phone or mobile phone or cell phone or cellphone or smartphone or smart phone or i-phone or iphone or i-pad or ipad or app or apps or mobile application\*)):ti,ab,kw OR ((mobile health or mobile technolog\* or mhealth)):ti,ab,kw OR ((email or e-mail or electronic mail or web\* or website\* or web site\* or

internet or online)):ti,ab,kw OR (((digital or electronic or technol\* or computer)NEAR/5(based or intervention or deliver\*))) :ti,ab,kw

23. (laptop or computer):ti,ab,kw OR ((wearable)NEAR/3(device or technolog\* or monitor or tracker or sensor)):ti,ab,kw OR (fitbit or fit bit or pedometer or accelerometer or fitness tracker):ti,ab,kw

24. #6 or #7 or #8 or #9 or #10 or #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18 or #19 or #20 or #21 or #22 or #23

25. MeSH descriptor: [Exercise] explode all trees

26. MeSH descriptor: [Exercise Therapy] explode all trees

27. MeSH descriptor: [Diet Therapy] explode all trees

28. MeSH descriptor: [Nutrition Therapy] this term only

29. MeSH descriptor: [Drinking Behavior] explode all trees

30. MeSH descriptor: [Diet, Sodium-Restricted] this term only

31. MeSH descriptor: [Sodium, Dietary] this term only

32. MeSH descriptor: [Sodium Chloride, Dietary] this term only

33. MeSH descriptor: [Health Behavior] explode all trees

34. MeSH descriptor: [Health Promotion] explode all trees

35. MeSH descriptor: [Risk Reduction Behavior] this term only
36. MeSH descriptor: [Preventive Medicine] this term only
37. MeSH descriptor: [Patient Education as Topic] explode all trees
38. ((exercise or physical activity or sport\* or walk\* or running or jog\* or swimming or cycling)):ti,ab,kw OR  
(((exercise\*)NEAR/3(intervention or therapy or program\* or train\*)):ti,ab,kw OR (((physical)NEAR/3(endurance or education or fitness or activit\* or train\*)):ti,ab,kw OR (((diet\* or food)NEAR/3(intervention\* or modif\*)):ti,ab,kw OR  
((health\*)NEAR/2(eating)):ti,ab,kw
39. (dieting):ti,ab,kw OR ((nutrition\*)NEAR/3(counselling or counseling or therapy)):ti,ab,kw OR (weight train\* or weight reduction or weight loss program\*):ti,ab,kw OR ((weight)NEAR/3(loss or reduc\* or decreas\* or change\* or control\* or manage\*)):ti,ab,kw OR ((BMI or body mass index)NEAR/3(loss or reduc\* or decreas\* or change\* or control\*)):ti,ab,kw
40. ((alcohol or drink)NEAR/3(reduc\* or decrease\* or chang\*)):ti,ab,kw OR (alcohol):ti OR ((salt or sodium)NEAR/3(low or reduc\* or restrict or chang\* or decrease or diet\*)):ti,ab,kw OR ((health\*)NEAR/3(behavio?r\*)):ti,ab,kw OR ((behavio?r\* or lifestyle)NEAR/3(chang\* or modif\* or therapy or therapies or program\* or intervention\* or counsel\* or advice)):ti,ab,kw
41. ((self-management or self management)):ti,ab,kw OR ((cigarette\* or smoking or tobacco)NEAR/3(reduc\* or quit\* or cessation or decreas\*)):ti,ab,kw

42. #25 or #26 or #27 or #28 or #29# or #30 or #31 or #32 or #33 or #34 or #35 or #36 or #37 or #38 or #39 or #40 or #41

43. #5 and #24 and #42 with Publication Year from 2000 to 2020, in Trial



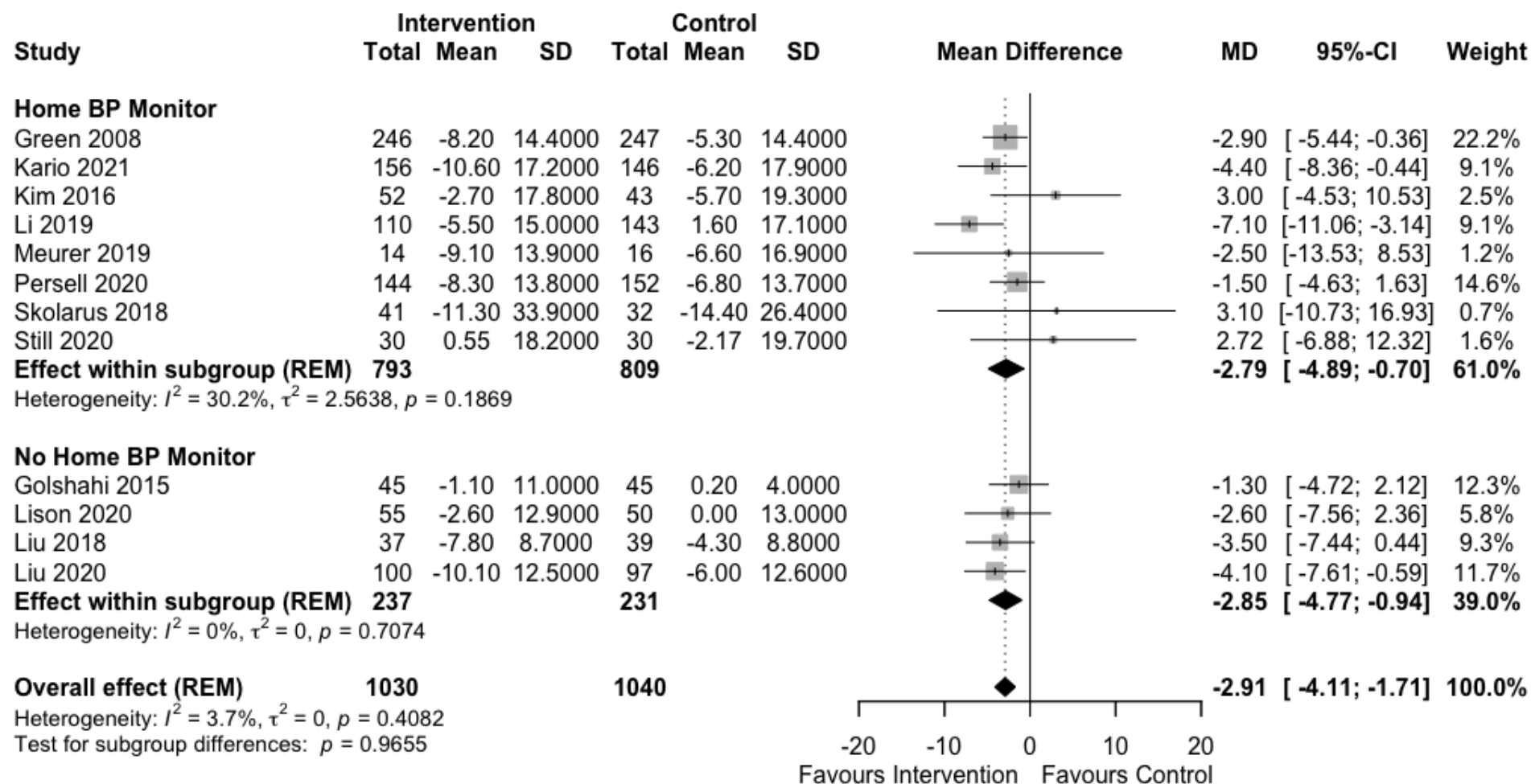
## SDC 2. Summary of blood pressure outcome reporting in included studies

| Study                 | n             |               | Baseline SBP (SD) mmHg |              | Primary outcome                                     | Reported BP values                                         | p value comparison                      | p value |
|-----------------------|---------------|---------------|------------------------|--------------|-----------------------------------------------------|------------------------------------------------------------|-----------------------------------------|---------|
|                       | Int           | Cont          | Int                    | Cont         |                                                     |                                                            |                                         |         |
| Green, 2008**[21]     | 246           | 247           | 152.2 (10)             | 151.3 (10.6) | Change in blood pressure                            | Mean SBP change from baseline to end point for both groups | Difference in SBP change between groups | 0.02    |
| Bennett, 2010[18]     | 51            | 50            | 134.7 (16.9)           | 137.1 (13.7) | Change in weight                                    | Mean difference in SBP change between groups               | No p value for between group difference |         |
| Golshahi, 2015***[33] | 45            | 45            | 149.6 (12.6)           | 149.6 (14.3) | Change in blood pressure                            | Mean SBP at baseline and endpoint for both groups          | ANOVA for between group differences     | <0.001  |
| Kim, 2016*[24]        | 52            | 43            | 136.1 (15.2)           | 145.9 (19.5) | Change in medication adherence score                | Mean SBP at baseline and endpoint for both groups          | No p value for between group difference |         |
| Liu, 2018*[26]        | 37            | 39            | 140.0 (11.6)           | 138.6 (11.2) | Change in systolic blood pressure                   | Mean SBP change from baseline to end point for both groups | Difference in SBP change between groups | 0.14    |
| Skolarus, 2018* [22]  | 41            | 32            | 160.7 (23.6)           | 162.2 (20.5) | Change in blood pressure                            | Mean SBP change from baseline to end point for both groups | Difference in SBP change between groups | 0.6     |
| Li, 2019* [31]        | 110           | 143           | 135.8 (15.9)           | 135.2 (14.8) | Change in systolic blood pressure                   | Mean difference in SBP change between groups               | Difference in SBP change between groups | <0.001  |
| Meurer, 2019* [23]    | 14            | 16            | Not reported           | Not reported | Proportion of patients with persistent hypertension | Mean SBP change from baseline to end point for both groups | No p value for between group difference |         |
| Rehman, 2019[30]      | Not specified | Not specified | 149.3 (5.6)            | 148.9 (5.5)  | Change in blood pressure                            | Mean SBP at baseline and endpoint for both groups          | No p value for between group difference |         |
| Borgstrom, 2020[27]   | 29            | 28            | 141.7 (13.8)           | 141.1 (13.8) | Feasibility of study                                | Mean difference in SBP change between groups               | ANCOVA for between group differences    | 0.19    |
| Jahan, 2020[29]       | 204           | 208           | 136.9 (19.2)           | 136.9 (19.3) | Evaluation of self-reported lifestyle change        | Mean SBP at baseline and endpoint for both groups          | ANOVA for between group differences     | 0.04    |
| Lison, 2020*[28]      | 55            | 50            | 132.2 (14.2)           | 128.5 (13.5) | Change in BMI                                       | Mean SBP change from baseline to end point for both groups | No p value for between group difference |         |

|                     |     |     |              |              |                                                           |                                                            |                                                                      |        |
|---------------------|-----|-----|--------------|--------------|-----------------------------------------------------------|------------------------------------------------------------|----------------------------------------------------------------------|--------|
| Liu, 2020* [25]     | 100 | 97  | 141.5 (12.2) | 140.6 (12.6) | Change in blood pressure                                  | Mean difference in SBP change between groups               | Difference in SBP change between groups                              | 0.02   |
| Persell, 2020* [20] | 144 | 152 | 140.6 (12.2) | 141.8 (13.4) | Change in SBP                                             | Mean SBP change from baseline to end point for both groups | Difference in SBP change between groups                              | 0.16   |
| Still, 2020*[19]    | 30  | 30  | 138.5 (14.8) | 141.2 (16.9) | Change in blood pressure                                  | Mean SBP change from baseline to end point for both groups | Difference in SBP change between groups                              | 0.89   |
| Yun, 2020[32]       | 41  | 39  | Not reported | Not reported | Percentage of patients meeting clinical target indicators | No blood pressure values given                             | Difference in percentage of patients achieving BP target <140/90mmHg | 0.04   |
| Kario, 2021*s[34]   | 192 | 180 | 144.9 (10.4) | 144.3 (10.4) | Change in 24hour ambulatory BP                            | Mean SBP change from baseline to end point for both groups | Difference in SBP change between groups (morning home SBP)           | <0.001 |

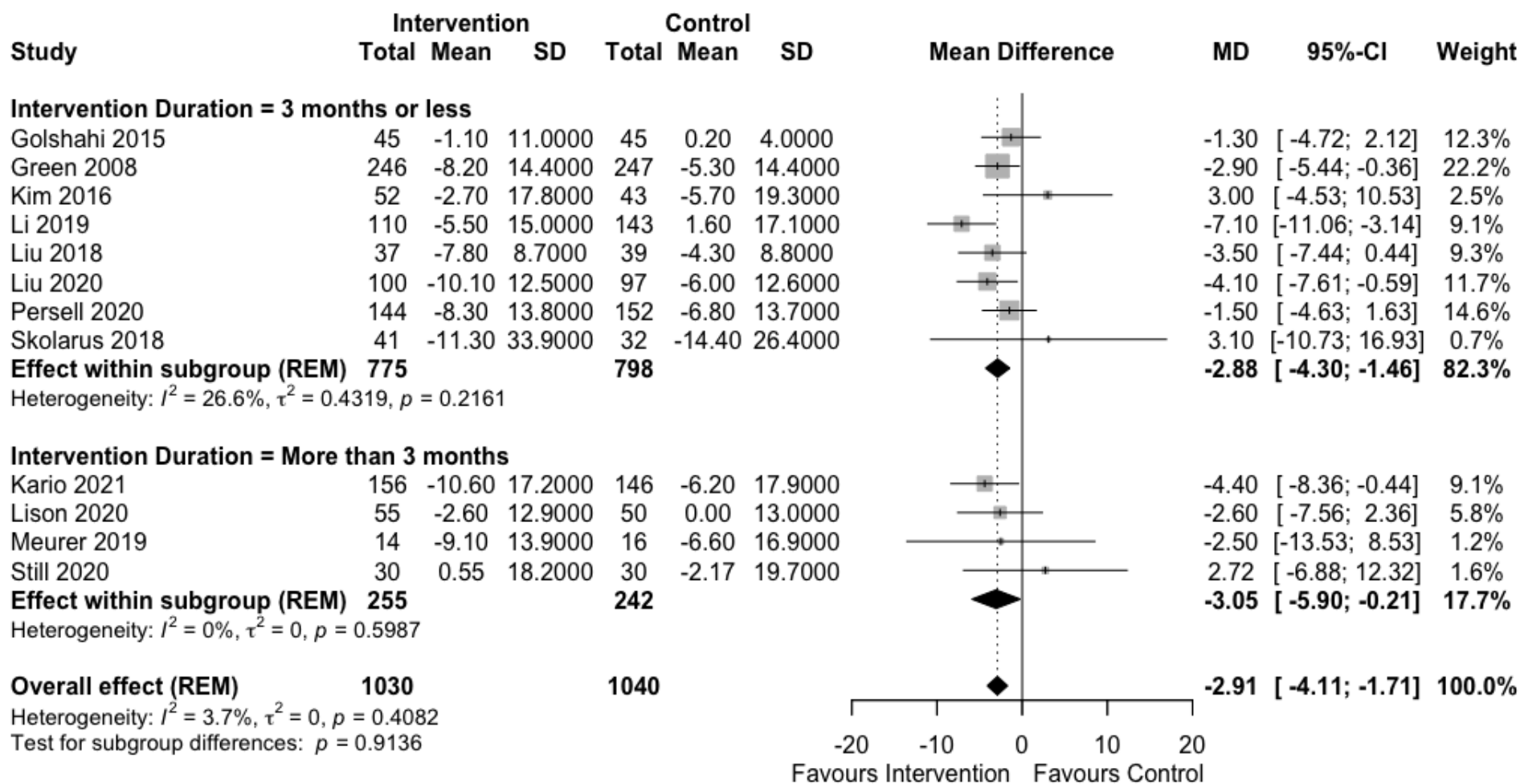
\*=study included in SBP meta-analysis, \*\*=study with >2 groups

SDC 3. Subgroup analysis of effect of home blood pressure monitoring on systolic blood pressure outcome

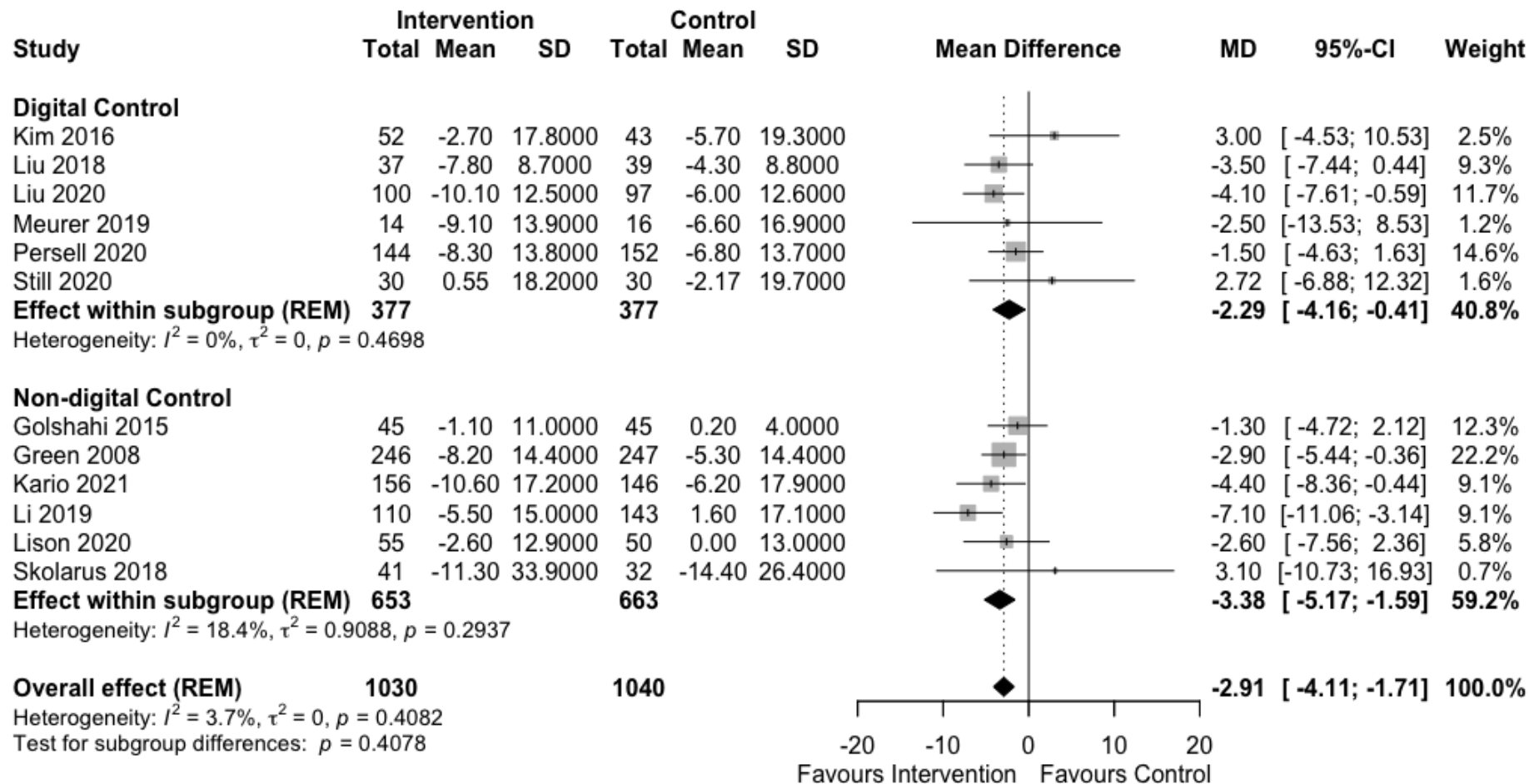




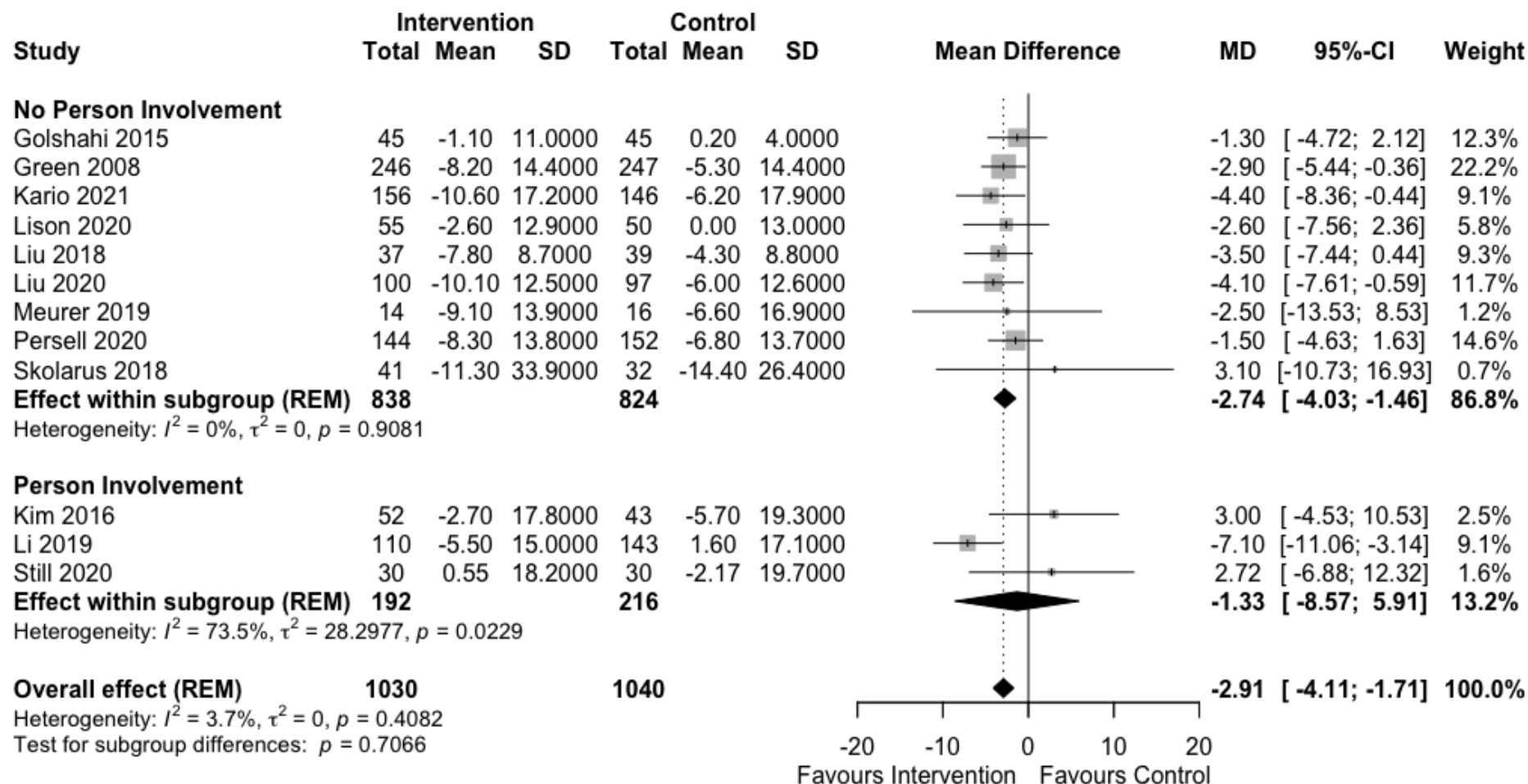
SDC 4. Subgroup analysis of effect of intervention duration on systolic blood pressure outcome



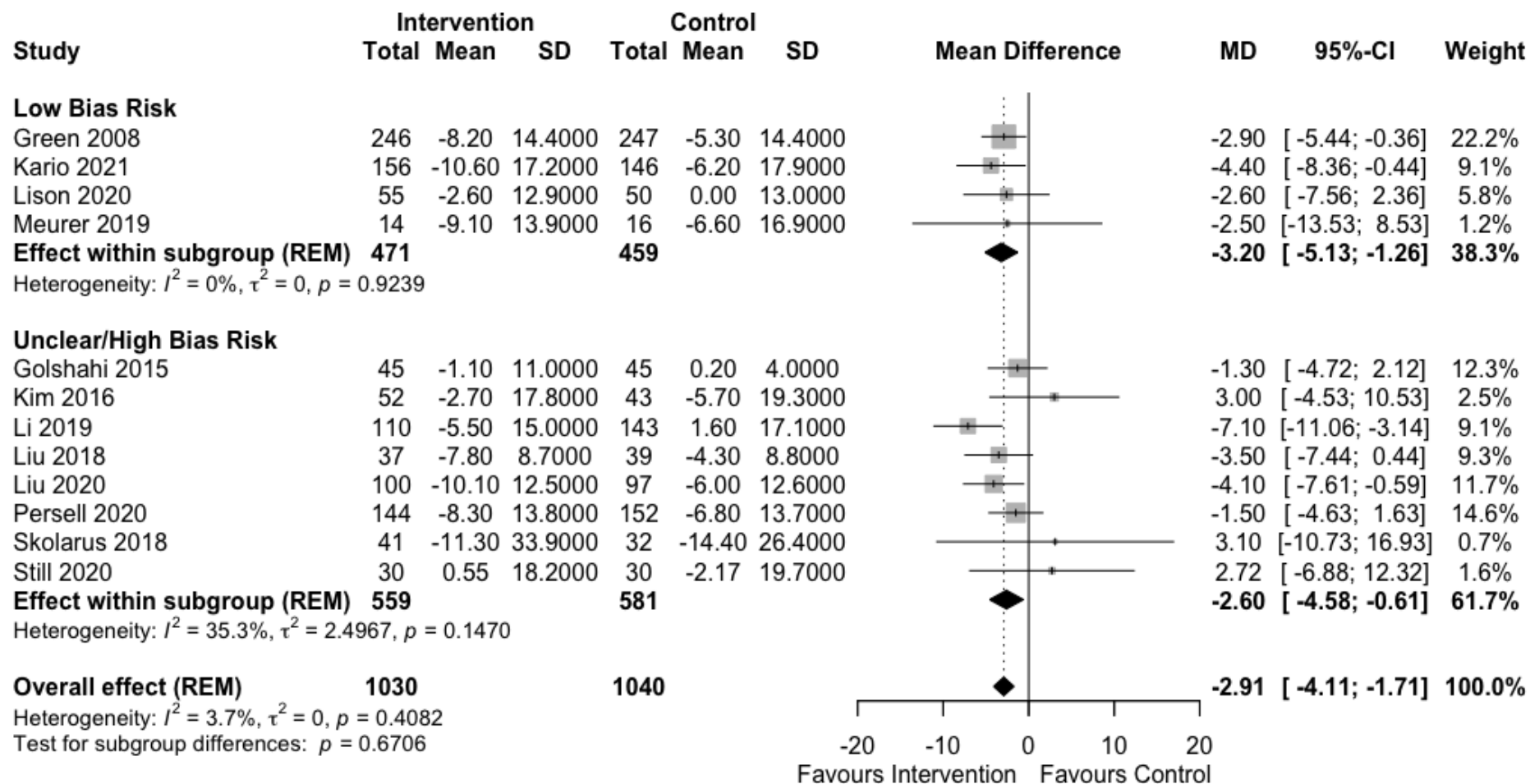
SDC 5. Subgroup analysis of effect of control characteristics on systolic blood pressure outcome



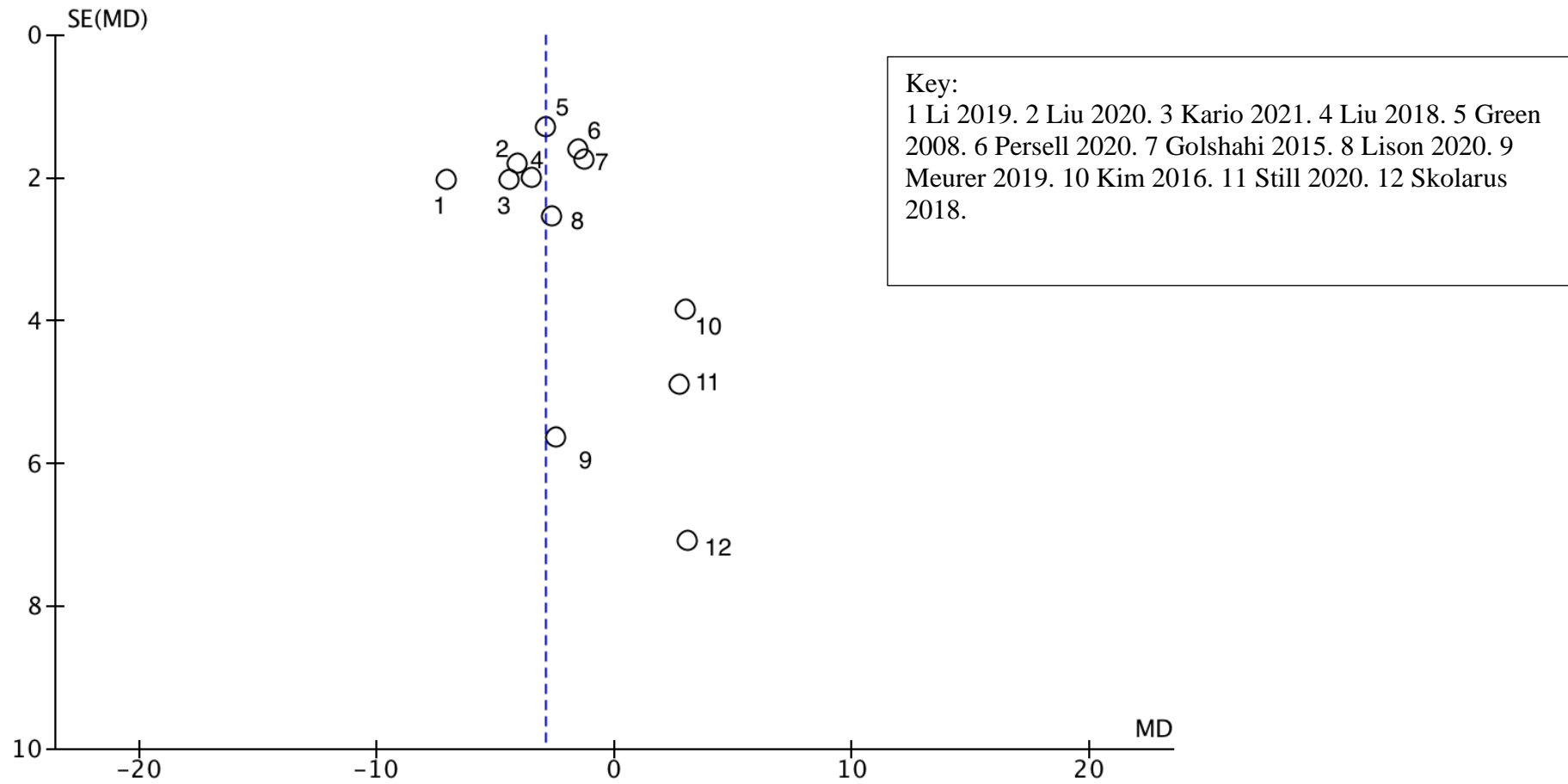
SDC 6. Subgroup analysis of effect of person involvement on systolic blood pressure outcome



SDC 7. Sensitivity analysis of effect of bias risk on systolic blood pressure outcome

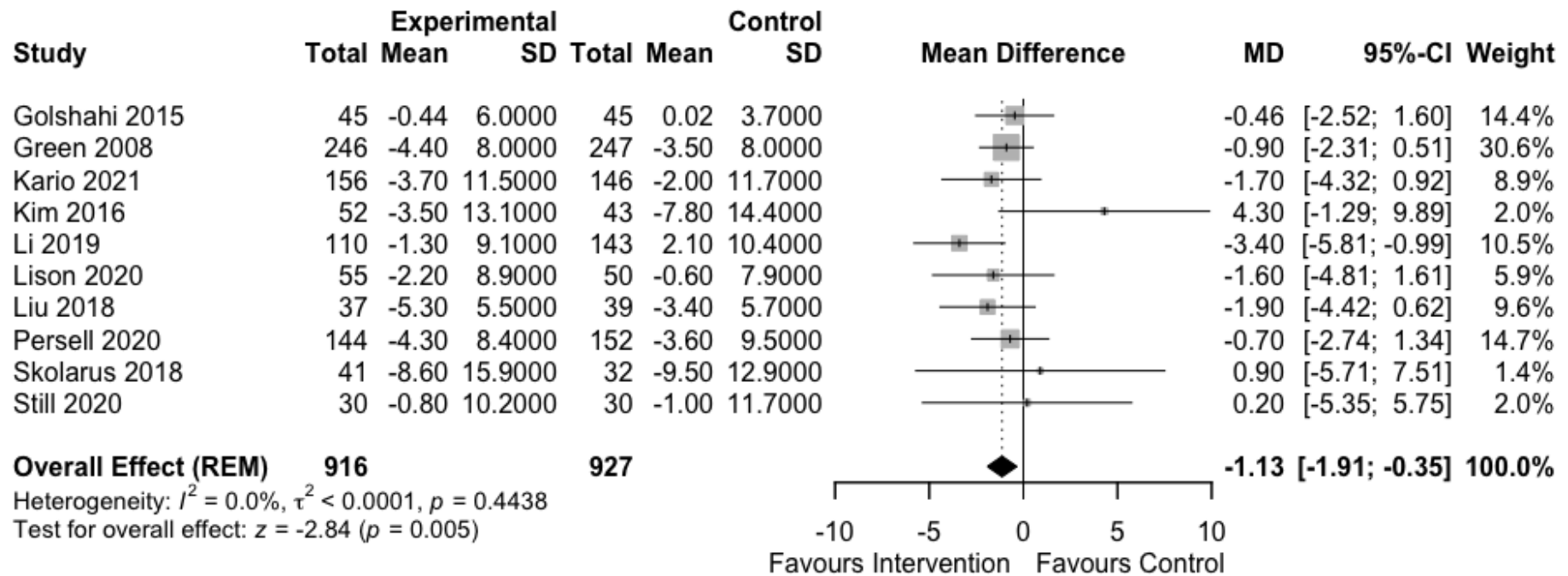


SDC 8. Funnel plot of studies included in the meta-analysis.



*SE: Standard Error; MD: Mean Difference*

SDC 9. Forest plot of the effect on diastolic blood pressure of digital interventions targeting lifestyle factors for hypertension.





|                     |                   |     |      |     |    |   |                                                               |     |      |                       |     |      |                                                                                  |     |      |     |   |
|---------------------|-------------------|-----|------|-----|----|---|---------------------------------------------------------------|-----|------|-----------------------|-----|------|----------------------------------------------------------------------------------|-----|------|-----|---|
| Rehman, 2019 [30]   | VNR               | -   | -    | VNR | -  | - | VNR                                                           | -   | -    | VNR                   | -   | -    | VNR                                                                              | -   | -    | VNR | - |
| Borgstrom, 2020[27] | Kg/m <sup>2</sup> | Yes | 0 13 | VNR | -  | - | VNR                                                           | -   | -    | VNR                   | -   | -    | VNR                                                                              | -   | -    | VNR | - |
| Jahan, 2020[29]     | VNR               | -   | -    | VNR | -  | - | Unspecified                                                   | No  | -    | Food salinity checker | No  | -    | Unspecified                                                                      | No  | -    | VNR | - |
| Lison, 2020[28]     | Kg/m <sup>2</sup> | No  | -    | VNR | -  | - | Counts/minute based on accelerometer                          | No  | -    | VNR                   | -   | -    | VNR                                                                              | -   | -    | VNR | - |
| Liu,2020[25]        | VNR               | -   | -    | VNR | -  | - | Daily steps based on pedometer                                | Yes | 0 02 | 24hour urinary sodium | Yes | 0 57 | VNR                                                                              | -   | -    | VNR | - |
| Persell, 2020[20]   | Kg/m <sup>2</sup> | Yes | 0 39 | VNR | -  | - | Minutes/week based on questionnaire                           | Yes | 0 1  | VNR                   | -   | -    | Consumption of processed meat, fried foods, sweetened beverages and candy d/week | Yes | 0 22 | VNR | - |
| Still,2020[19]      | Kg/m <sup>2</sup> | No  | -    | Lbs | No | - | VNR                                                           | -   | -    | VNR                   | -   | -    | VNR                                                                              | -   | -    | VNR | - |
| Yun, 2020[32]       | VNR               | -   | -    | VNR | -  | - | Metabolic equivalents of task activity based on questionnaire | Yes | 0 23 | VNR                   | -   | -    | VNR                                                                              | -   | -    | VNR | - |

|                    |                   |     |       |    |     |       |     |   |   |                                                   |     |        |     |   |   |     |   |
|--------------------|-------------------|-----|-------|----|-----|-------|-----|---|---|---------------------------------------------------|-----|--------|-----|---|---|-----|---|
| Kario,<br>2021[34] | Kg/m <sup>2</sup> | Yes | 0.005 | Kg | Yes | 0.003 | VNR | - | - | Salt<br>intake<br>based on<br>salt check<br>sheet | Yes | <0.001 | VNR | - | - | VNR | - |
|--------------------|-------------------|-----|-------|----|-----|-------|-----|---|---|---------------------------------------------------|-----|--------|-----|---|---|-----|---|

*VNR = value not reported*

| p-value |
|---------|
| -       |
| -       |
| -       |
| <0.001  |
| -       |
| -       |
| -       |
| -       |

