**Supplementary figure legends**

**Fig. S1.** Summary of each group’s intervention approach.

**Supplementary Appendix S1. Exclusion criteria**

Individuals were excluded if they had other types of diabetes (type 1 diabetes or gestational diabetes), uncontrolled chronic liver disease, acute kidney injury, or any psychological disorder. Individuals using insulin or glucagon-like peptide-1 (GLP-1) receptor agonist injections or anti-obesity medication; those who were pregnant, lactating, or planning for pregnancy; and those who had a history of alcoholism, drug addiction, or use of medications that affect glucose metabolism (such as corticosteroids or immunosuppressants) within 3 months before the screening were also excluded. A complete list of eligibility criteria has been provided previously (1).

References

1. Park SW, Kim G, Hwang YC, Lee WJ, Park H, Kim JH. Validation of the effectiveness of a digital integrated healthcare platform utilizing an AI-based dietary management solution and a real-time continuous glucose monitoring system for diabetes management: a randomized controlled trial. BMC Med Inform Decis Mak 2020;20:156

**Supplementary Appendix S2. Details on the nature of nutritional intervention messages sent to participants in group C**

A copy of food exchange table was provided to participants in group C on the first day of the trial. Daily calorie requirement for each participant in group C was calculated considering the activity level and ideal body weight (IBW) derived from height. The nutritional intervention messages consisted of 4 types: warning, education, encouragement, or confirmation (Table S1). For certain situations, specific pre-written example texts were invented. Based on participant healthcare data (blood glucose, CGM metrics, body weight, blood pressure, exercise, and diet), personalized messages were sent using and if needed, modifying the pre-specified example texts. Daily calorie requirement estimated from IBW and activity level of each participant was considered, and personalized intervention messages were also based on the exchange units for each food group in the food exchange table for meal plan according to the calorie requirement of each participant. During the study periods, these text messages were sent once a week. However, at weeks 12, 24, 36, and 48, 3-days of intensive care periods were set. During intensive care periods, daily interventional text messages were sent for 3 consecutive days. Furthermore, nutritional education messages common to all participants in group C were sent every 4 weeks in addition to the weekly intervention messages and 3-days of daily intervention messages during intensive care periods. Contents of nutritional education messages are summarized in Table S1.

**Table S1. Contents and examples of intervention text messages sent to participants in group C**

|  |  |
| --- | --- |
| Types of messages | Examples |
| Warning | - Diet records are missing.  - It was a sugar-based meal (Beware of excess sugar).  - Insufficient vegetable intake.  - You gained weight.  - Fasting glucose level is above the target range. Action is needed. |
| Education | - Eat an appropriate amount of fruit (Education on proper fruit intake).  - Nutritional education messages   |  |  | | --- | --- | | Times: week | Education topic | | 1st: week 4 | Diet therapy for blood glucose control | | 2nd: week 8 | Exercise like this | | 3rd: week 12 | Choose foods with a low glycemic index | | 4th: week 16 | Check the Nutrition Facts Table | | 5th: week 20 | Beware of alcohol intake | | 6th: week 24 | How to choose a dining out menu | | 7th: week 28 | Foods to watch out for | | 8th: week 32 | Foods that can be consumed freely | | 9th: week 36 | Beware of unproven folk remedies | | 10th: week 40 | Actions to manage hyperglycemia | | 11th: week 44 | Practice a regular diet | | 12th: week 48 | Saturated versus unsaturated fats |   - (A), like rice, belongs to the grain group.  - Beware of too frequent snacking. |
| Encouragement | - Weight loss (0.0) kg, good result.  - Fasting glucose level, within the target range.  - Walk more than 10,000 steps, practice this week as well. |
| Confirmation of action | - A diet with green vegetables, practice it.  - It is good to add (B) to your breakfast.  - Last week, walking more than 10,000 steps, practiced 3 times a week. |

**Table S2. Secondary endpoints**

|  |  |
| --- | --- |
| For groups A, B, and C | * Change in HbA1c from baseline to week 24, difference between groups A and C, and difference between groups B and C * Change in HbA1c from baseline to weeks 12, 36, and 48, difference between groups A and B, A and C, and B and C * Change in fasting plasma glucose from baseline to weeks 12, 24, 36, and 48, difference between groups A and B, A and C, and B and C * Change in body weight from baseline to weeks 12, 24, 36, and 48, difference between groups A and B, A and C, and B and C * Changes in lipid profiles from baseline to weeks 24 and 48, difference between groups A and B, A and C, and B and C * Change in the number of hypoglycemic events during the 3 months preceding each assessment, difference between groups A and B, A and C, and B and C * Change in scores on the Diabetes Treatment Satisfaction Questionnaire (DTSQ) from baseline to weeks 12, 24, 36, and 48, difference between groups A and B, A and C, and B and C |
| For group C | * For group C, the number of educational interventions by medical staff at weeks 12, 24, 36, and 48 * For group C, within group changes in the CGM metrics obtained during the 1 week prior to baseline and the assessments at weeks 12, 24, 36, and 48 |

**Table S3. Criteria for applying rescue therapy (addition or titration of diabetes medication)**

|  |  |
| --- | --- |
| Until week 24 | * In all three groups, if HbA1c was ≥10% or symptoms of hypoglycemia or hyperglycemia developed according to the discretion of physicians |
| After week 24 | * In all three groups, when HbA1c was ≥8.5%, or hyperglycemic or hypoglycemic symptoms occurred according to the discretion of physicians * In group C, when TBR (<70 mg/dL) was >3% or TAR (>180 mg/dL) was >30% on the CGM at the discretion of physicians. |

Abbreviations: TBR, time-below-range; TAR, time-above-range, CGM, continuous glucose monitoring.

**Table S4. Change in HbA1c from baseline by treatment group, sensitivity analyses in the randomized population**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Group A (n = 95)** | **Group B (n = 93)** | **Group C (n = 93)** |
| **HbA1c (%) at baseline** | 7.44 (0.35) | 7.47 (0.38) | 7.44 (0.40) |
| **HbA1c (%) at week 12** | 7.32 (0.73) | 7.19 (0.61) | 7.24 (0.91) |
| **HbA1c (%) at week 24** | 7.39 (0.67) | 7.15 (0.69) | 6.97 (0.61) |
| **HbA1c (%) at week 36** | 7.51 (0.86) | 7.22 (0.65) | 6.99 (0.67) |
| **HbA1c (%) at week 48** | 7.51 (0.80) | 7.20 (0.64) | 7.02 (0.66) |
| **Change in HbA1c (%) from baseline to week 12** | -0.12 (0.70)\* | -0.27 (0.52)\*a | -0.20 (0.86)\* |
| **Change in HbA1c (%) from baseline to week 24** | -0.05 (0.60) | -0.32 (0.58)\*a | -0.47 (0.57)\*a |
| **Change in HbA1c (%) from baseline to week 36** | 0.07 (0.82) | -0.25 (0.50)\*a | -0.45 (0.62)\*a |
| **Change in HbA1c (%) from baseline to week 48** | 0.07 (0.76) | -0.27 (0.55)\*a | -0.42 (0.62)\*a |

Data are the mean (standard deviation) unless stated otherwise. The randomized population consisted of all participants with at least one available baseline or post-baseline value among those who were randomly assigned.

\* *P*-value (within group) <0.05.

a Significantly different from that in control group A.

Changes in HbA1c from baseline were not significantly different between groups B and C.

Abbreviations: HbA1c, hemoglobin A1c.

**Table S5. Change in HbA1c from baseline, subgroup analysis according to baseline HbA1c level**

|  |  |  |  |
| --- | --- | --- | --- |
| **Subgroup with baseline HbA1c <7.5%** | **Group A (n = 51)** | **Group B (n = 49)** | **Group C (n = 58)** |
| **HbA1c (%) at baseline** | 7.19 (0.14) | 7.20 (0.15) | 7.20 (0.13) |
| **HbA1c (%) at week 12** | 7.12 (0.48) | 6.90 (0.45) | 7.04 (0.76) |
| **HbA1c (%) at week 24** | 7.15 (0.41) | 6.82 (0.45) | 6.82 (0.47) |
| **HbA1c (%) at week 36** | 7.27 (0.69) | 6.86 (0.43) | 6.86 (0.55) |
| **HbA1c (%) at week 48** | 7.25 (0.54) | 6.93 (0.52) | 6.86 (0.56) |
| **Change in HbA1c (%) from baseline to week 12** | -0.08 (0.48) | -0.30 (0.46)\*a | -0.16 (0.74)\* |
| **Change in HbA1c (%) from baseline to week 24** | -0.04 (0.41) | -0.38 (0.43)\*a | -0.38 (0.45)\*a |
| **Change in HbA1c (%) from baseline to week 36** | 0.08 (0.69) | -0.33 (0.41)\*a | -0.34 (0.54)\*a |
| **Change in HbA1c (%) from baseline to week 48** | 0.06 (0.53) | -0.26 (0.51)\*a | -0.34 (0.55)\*a |
| **Subgroup with baseline HbA1c ≥7.5%** | **Group A (n = 41)** | **Group B (n = 42)** | **Group C (n = 32)** |
| **HbA1c (%) at baseline** | 7.77 (0.27) | 7.80 (0.30) | 7.87 (0.36) |
| **HbA1c (%) at week 12** | 7.55 (0.97) | 7.54 (0.62) | 7.58 (1.09) |
| **HbA1c (%) at week 24** | 7.69 (0.82) | 7.54 (0.74) | 7.18 (0.74) |
| **HbA1c (%) at week 36** | 7.83 (0.97) | 7.64 (0.62) | 7.18 (0.81) |
| **HbA1c (%) at week 48** | 7.86 (0.96) | 7.50 (0.64) | 7.26 (0.75) |
| **Change in HbA1c (%) from baseline to week 12** | -0.20 (0.98)\* | -0.26 (0.60)\* | -0.29 (1.09) |
| **Change in HbA1c (%) from baseline to week 24** | -0.08 (0.80) | -0.26 (0.72)\* | -0.68 (0.72)\*ab |
| **Change in HbA1c (%) from baseline to week 36** | 0.07 (0.98) | -0.16 (0.58) | -0.69 (0.72)\*ab |
| **Change in HbA1c (%) from baseline to week 48** | 0.09 (1.01) | -0.30 (0.62)\*a | -0.61 (0.71)\*a |

Data are the mean (standard deviation) unless stated otherwise. The full analysis set was defined as the modified intention-to-treat population, consisting of all participants with at least one available post-baseline value among those who were randomly assigned.

\* *P*-value (within group) <0.05.

a Significantly different from that in control group A.

b Significantly different from that in group B.

Abbreviations: HbA1c, hemoglobin A1c.

**Table S6. Change in fasting plasma glucose from baseline by treatment group**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Group A (n = 92)** | **Group B (n = 91)** | **Group C (n = 90)** |
| **FPG (mg/dL) at baseline** | 143.88 (24.70) | 148.16 (25.48) | 148.84 (23.24) |
| **FPG (mg/dL) at week 12** | 142.23 (31.23) | 142.67 (24.68) | 143.82 (33.16) |
| **FPG (mg/dL) at week 24** | 142.34 (31.84) | 142.91 (31.85) | 137.34 (29.78) |
| **FPG (mg/dL) at week 36** | 145.26 (41.23) | 140.75 (29.33) | 136.72 (24.39) |
| **FPG (mg/dL) at week 48** | 143.18 (27.76) | 145.52 (31.90) | 136.06 (28.11) |
| **Change in FPG (mg/dL) from baseline to week 12** | -1.90 (30.63) | -5.62 (23.80)\* | -5.11 (35.11)\* |
| **Change in FPG (mg/dL) from baseline to week 24** | -1.13 (27.99) | -5.25 (27.65)\* | -11.50 (32.75)\*a |
| **Change in FPG (mg/dL) from baseline to week 36** | 1.38 (36.95) | -7.42 (29.26)\*a | -12.12 (25.92)\*a |
| **Change in FPG (mg/dL) from baseline to week 48** | -0.70 (26.66) | -2.65 (27.41) | -12.79 (32.14)\*ab |

Data are the mean (standard deviation) unless stated otherwise. The full analysis set was defined as the modified intention-to-treat population, consisting of all participants with at least one available post-baseline value among those who were randomly assigned.

\* *P*-value (within group) <0.05

a Significantly different from that in control group A

b Significantly different from that in group B

Abbreviations: FPG, fasting plasma glucose

**Table S7. Change in body weight from baseline by treatment group**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Group A (n = 92)** | **Group B (n = 91)** | **Group C (n = 90)** |
| **Body weight (kg) at baseline** | 71.74 (11.20) | 73.94 (10.42) | 75.50 (15.12) |
| **Body weight (kg) at week 12** | 71.22 (11.11) | 72.83 (10.83) | 73.74 (14.98) |
| **Body weight (kg) at week 24** | 71.17 (11.03) | 72.44 (10.85) | 73.61 (15.36) |
| **Body weight (kg) at week 36** | 70.53 (10.95) | 72.83 (10.91) | 73.57 (15.87) |
| **Body weight (kg) at week 48** | 71.13 (11.19) | 72.63 (10.60) | 74.26 (15.83) |
| **Change in body weight (kg) from baseline to week 12** | -0.64 (1.97)\* | -1.12 (2.35)\*a | -1.76 (2.06)\*a |
| **Change in body weight (kg) from baseline to week 24** | -0.45 (1.98)\* | -1.39 (2.34)\*a | -1.86 (2.50)\*a |
| **Change in body weight (kg) from baseline to week 36** | -0.75 (2.27)\* | -1.26 (2.71)\* | -1.89 (2.85)\*a |
| **Change in body weight (kg) from baseline to week 48** | -0.69 (2.21)\* | -1.43 (2.56)\* | -1.90 (3.07)\*a |

Data are the mean (standard deviation) unless stated otherwise. The full analysis set was defined as the modified intention-to-treat population, consisting of all participants with at least one available post-baseline value among those who were randomly assigned.

\* *P*-value (within group) <0.05.

a Significantly different from that in control group A.

Changes in body weight from baseline were not significantly different between groups B and C.

**Table S8. Change in lipid profiles from baseline to weeks 24 and 48 by treatment group**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Group A (n = 92)** | **Group B (n = 91)** | **Group C (n = 90)** |
| **Change in HDL-C (mg/dL) from baseline to week 24** | 0.66 (6.86) | 2.98 (13.62)\* | 1.72 (6.93)\* |
| **Change in HDL-C (mg/dL) from baseline to week 48** | 1.16 (7.26) | 1.89 (8.10)\* | 1.89 (7.80) |
| **Change in triglycerides (mg/dL) from baseline to week 24** | -22.71 (69.50)\* | -15.04 (119.05)\* | -6.05 (66.20)\* |
| **Change in triglycerides (mg/dL) from baseline to week 48** | -5.95 (102.08) | -10.65 (80.39)\* | -9.72 (64.61) |
| **Change in LDL-C (mg/dL) from baseline to week 24** | -1.46 (14.16) | -3.10 (25.22) | -6.17 (17.49)\*a |
| **Change in LDL-C (mg/dL) from baseline to week 48** | -3.96 (20.44) | -4.00 (24.13) | -5.57 (20.69)\* |

Data are the mean (standard deviation) unless stated otherwise. The full analysis set was defined as the modified intention-to-treat population, consisting of all participants with at least one available post-baseline value among those who were randomly assigned.

\* *P*-value (within group) <0.05.

a Significantly different from that in control group A.

Changes in lipid profiles from baseline were not significantly different between groups A and B, or between groups B and C.

Abbreviations: HDL-C, high-density-lipoprotein cholesterol; LDL-C, low-density-lipoprotein cholesterol

**Table S9. Change in number of hypoglycemic events (during the 3 months preceding each assessment) from baseline by treatment group**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Group A (n = 92)** | **Group B (n = 91)** | **Group C (n = 90)** |
| **Number of hypoglycemic events at baseline** | 0.36 (1.10) | 0.23 (0.92) | 0.29 (1.18) |
| **Number of hypoglycemic events at week 12** | 0.10 (0.40) | 0.10 (0.45) | 0.42 (1.38) |
| **Number of hypoglycemic events at week 24** | 0.14 (0.55) | 0.07 (0.29) | 0.47 (1.41) |
| **Number of hypoglycemic events at week 36** | 0.08 (0.34) | 0.03 (0.18) | 0.40 (1.51) |
| **Number of hypoglycemic events at week 48** | 0.07 (0.39) | 0.00 (0.00) | 0.20 (1.00) |
| **Change in number of hypoglycemic events from baseline to week 12** | -0.24 (1.13) | -0.13 (1.05) | 0.13 (1.89) |
| **Change in number of hypoglycemic events from baseline to week 24** | -0.22 (1.08) | -0.17 (0.95) | 0.18 (1.91) |
| **Change in number of hypoglycemic events from baseline to week 36** | -0.28 (1.01)\* | -0.21 (0.94)\* | 0.11 (1.86) |
| **Change in number of hypoglycemic events from baseline to week 48** | -0.29 (1.07)\* | -0.23 (0.92)\* | -0.09 (1.58) |

Data are the mean (standard deviation) unless stated otherwise. The full analysis set was defined as the modified intention-to-treat population, consisting of all participants with at least one available post-baseline value among those who were randomly assigned.

\* *P*-value (within group) <0.05.

Changes in number of hypoglycemic events from baseline were not significantly different between groups.

**Table S10. Change in Diabetes Treatment Satisfaction Questionnaire scores from baseline by treatment group**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Group A (n = 92)** | **Group B (n = 91)** | **Group C (n = 90)** |
| **Questions on treatment satisfaction** | | | |
| **Score for Q1 at baseline** | 4.85 (1.25) | 4.45 (1.33) | 4.70 (1.37) |
| **Score for Q1 at week 12** | 5.08 (1.05) | 4.85 (1.26) | 5.04 (1.27) |
| **Score for Q1 at week 24** | 5.23 (1.04) | 5.07 (0.95) | 5.24 (0.95) |
| **Score for Q1 at week 36** | 5.12 (1.12) | 5.03 (1.00) | 5.39 (0.90) |
| **Score for Q1 at week 48** | 5.21 (1.07) | 5.23 (0.93) | 5.29 (1.05) |
| **Change in scores for Q1 from baseline to week 12** | 0.24 (1.27) | 0.40 (1.34)\* | 0.34 (1.54)\* |
| **Change in scores for Q1 from baseline to week 24** | 0.38 (1.32)\* | 0.62 (1.31)\* | 0.54 (1.54)\* |
| **Change in scores for Q1 from baseline to week 36** | 0.27 (1.39)\* | 0.58 (1.33)\* | 0.69 (1.50)\* |
| **Change in scores for Q1 from baseline to week 48** | 0.36 (1.31)\* | 0.78 (1.43)\*a | 0.59 (1.55)\* |
| **Score for Q4 at baseline** | 4.58 (1.45) | 4.34 (1.48) | 4.42 (1.47) |
| **Score for Q4 at week 12** | 4.76 (1.45) | 4.56 (1.32) | 4.54 (1.50) |
| **Score for Q4 at week 24** | 5.02 (1.10) | 4.78 (1.19) | 4.88 (1.25) |
| **Score for Q4 at week 36** | 4.96 (1.24) | 4.66 (1.21) | 4.90 (1.11) |
| **Score for Q4 at week 48** | 5.05 (1.22) | 5.03 (1.05) | 5.02 (1.34) |
| **Change in scores for Q4 from baseline to week 12** | 0.16 (1.78) | 0.22 (1.44) | 0.12 (1.74) |
| **Change in scores for Q4 from baseline to week 24** | 0.45 (1.41)\* | 0.44 (1.64)\* | 0.46 (1.66)\* |
| **Change in scores for Q4 from baseline to week 36** | 0.38 (1.69)\* | 0.32 (1.66) | 0.48 (1.55)\* |
| **Change in scores for Q4 from baseline to week 48** | 0.48 (1.69)\* | 0.69 (1.55)\* | 0.60 (1.79)\* |
| **Score for Q5 at baseline** | 4.45 (1.55) | 4.47 (1.27) | 4.27 (1.56) |
| **Score for Q5 at week 12** | 4.93 (1.13) | 4.65 (1.32) | 4.42 (1.36) |
| **Score for Q5 at week 24** | 5.04 (1.13) | 4.74 (1.18) | 4.71 (1.28) |
| **Score for Q5 at week 36** | 4.96 (1.21) | 4.71 (1.26) | 5.06 (1.12) |
| **Score for Q5 at week 48** | 5.21 (0.99) | 4.97 (1.17) | 4.88 (1.21) |
| **Change in scores for Q5 from baseline to week 12** | 0.46 (1.55)\* | 0.18 (1.41) | 0.16 (1.63) |
| **Change in scores for Q5 from baseline to week 24** | 0.60 (1.62)\* | 0.26 (1.58) | 0.44 (1.67)\* |
| **Change in scores for Q5 from baseline to week 36** | 0.51 (1.53)\* | 0.24 (1.49) | 0.79 (1.57)\*b |
| **Change in scores for Q5 from baseline to week 48** | 0.76 (1.51)\* | 0.49 (1.51)\* | 0.61 (1.69)\* |
| **Score for Q6 at baseline** | 4.28 (1.20) | 4.24 (1.34) | 4.02 (1.45) |
| **Score for Q6 at week 12** | 4.60 (1.13) | 4.49 (1.27) | 4.47 (1.09) |
| **Score for Q6 at week 24** | 4.66 (1.07) | 4.55 (1.17) | 4.80 (1.06) |
| **Score for Q6 at week 36** | 4.70 (1.10) | 4.66 (1.14) | 4.74 (1.18) |
| **Score for Q6 at week 48** | 4.83 (0.99) | 4.98 (1.03) | 4.76 (1.22) |
| **Change in scores for Q6 from baseline to week 12** | 0.32 (1.27)\* | 0.25 (1.48) | 0.44 (1.45)\* |
| **Change in scores for Q6 from baseline to week 24** | 0.38 (1.35)\* | 0.31 (1.24)\* | 0.78 (1.57)\*b |
| **Change in scores for Q6 from baseline to week 36** | 0.41 (1.35)\* | 0.42 (1.29)\* | 0.72 (1.62)\* |
| **Change in scores for Q6 from baseline to week 48** | 0.54 (1.43)\* | 0.74 (1.38)\* | 0.73 (1.76)\* |
| **Score for Q7 at baseline** | 4.42 (1.51) | 4.13 (1.78) | 4.27 (1.56) |
| **Score for Q7 at week 12** | 4.49 (1.59) | 4.71 (1.50) | 4.93 (1.40) |
| **Score for Q7 at week 24** | 4.63 (1.50) | 4.70 (1.32) | 4.99 (1.24) |
| **Score for Q7 at week 36** | 4.88 (1.18) | 4.84 (1.38) | 5.13 (1.16) |
| **Score for Q7 at week 48** | 4.80 (1.34) | 4.70 (1.40) | 5.02 (1.26) |
| **Change in scores for Q7 from baseline to week 12** | 0.02 (1.81) | 0.58 (1.80)\*a | 0.67 (1.66)\*a |
| **Change in scores for Q7 from baseline to week 24** | 0.21 (1.76) | 0.57 (1.89)\* | 0.72 (1.55)\*a |
| **Change in scores for Q7 from baseline to week 36** | 0.46 (1.55)\* | 0.70 (1.87)\* | 0.87 (1.75)\* |
| **Change in scores for Q7 from baseline to week 48** | 0.38 (1.72)\* | 0.57 (2.05)\* | 0.76 (1.55)\* |
| **Score for Q8 at baseline** | 4.48 (1.63) | 4.37 (1.47) | 4.59 (1.33) |
| **Score for Q8 at week 12** | 4.82 (1.39) | 4.60 (1.59) | 4.84 (1.46) |
| **Score for Q8 at week 24** | 5.08 (1.30) | 4.98 (1.24) | 5.06 (1.21) |
| **Score for Q8 at week 36** | 5.09 (1.13) | 4.93 (1.35) | 5.17 (1.06) |
| **Score for Q8 at week 48** | 5.26 (1.07) | 5.10 (1.09) | 5.12 (1.14) |
| **Change in scores for Q8 from baseline to week 12** | 0.30 (1.95) | 0.23 (1.67) | 0.26 (1.81) |
| **Change in scores for Q8 from baseline to week 24** | 0.60 (1.56)\* | 0.60 (1.76)\* | 0.47 (1.50)\* |
| **Change in scores for Q8 from baseline to week 36** | 0.61 (1.62)\* | 0.56 (1.66)\* | 0.58 (1.33)\* |
| **Change in scores for Q8 from baseline to week 48** | 0.78 (1.62)\* | 0.73 (1.69)\* | 0.53 (1.46)\* |
| **Questions on burden of hyperglycemia and hypoglycemia** | | | |
| **Score for Q2 at baseline** | 1.50 (1.67) | 1.93 (1.81) | 2.33 (1.99) |
| **Score for Q2 at week 12** | 1.60 (1.71) | 1.70 (1.57) | 2.27 (1.83) |
| **Score for Q2 at week 24** | 1.30 (1.52) | 1.97 (1.77) | 2.28 (1.68) |
| **Score for Q2 at week 36** | 1.53 (1.74) | 1.70 (1.63) | 2.24 (1.84) |
| **Score for Q2 at week 48** | 1.21 (1.55) | 1.43 (1.75) | 1.81 (1.70) |
| **Change in scores for Q2 from baseline to week 12** | 0.20 (2.00) | -0.23 (2.03) | -0.07 (2.37) |
| **Change in scores for Q2 from baseline to week 24** | -0.20 (1.86) | 0.03 (2.05) | -0.06 (2.39) |
| **Change in scores for Q2 from baseline to week 36** | 0.03 (1.95) | -0.23 (2.04) | -0.09 (2.43) |
| **Change in scores for Q2 from baseline to week 48** | -0.29 (1.98) | -0.51 (2.16)\* | -0.52 (2.20)\* |
| **Score for Q3 at baseline** | 1.14 (1.46) | 1.03 (1.31) | 1.00 (1.29) |
| **Score for Q3 at week 12** | 0.91 (1.25) | 1.25 (1.57) | 0.99 (1.26) |
| **Score for Q3 at week 24** | 0.98 (1.44) | 0.96 (1.33) | 1.11 (1.66) |
| **Score for Q3 at week 36** | 0.75 (1.16) | 0.90 (1.15) | 1.03 (1.45) |
| **Score for Q3 at week 48** | 0.78 (1.31) | 0.96 (1.49) | 0.94 (1.41) |
| **Change in scores for Q3 from baseline to week 12** | -0.21 (1.70) | 0.22 (1.54) | -0.01 (1.69) |
| **Change in scores for Q3 from baseline to week 24** | -0.16 (1.76) | -0.08 (1.54) | 0.11 (2.13) |
| **Change in scores for Q3 from baseline to week 36** | -0.39 (1.68)\* | -0.13 (1.56) | 0.03 (1.93) |
| **Change in scores for Q3 from baseline to week 48** | -0.36 (1.79)\* | -0.08 (1.71) | -0.06 (1.92) |

Data are the mean (standard deviation) unless stated otherwise. The full analysis set was defined as the modified intention-to-treat population, consisting of all participants with at least one available post-baseline value among those who were randomly assigned.

Six questions in the Diabetes Treatment Satisfaction Questionnaire (DTSQ) ask about treatment satisfaction on a scale ranging from zero to six, with higher scores indicating higher satisfaction: Q1 “satisfaction with current treatment”; Q4 “convenience”; Q5 “flexibility”; Q6 “understanding of diabetes”; Q7 “recommend treatment to others”; Q8 “willingness to continue.”

The last two questions (Q2 and 3) of the DTSQ investigate the burden of hyperglycemia and hypoglycemia, respectively, with zero points indicating “none of the time” and six points suggesting “most of the time.”

\* *P*-value (within group) <0.05.

a Significantly different from that in control group A.

b Significantly different from that in group B.

**Table S11. Change in CGM metrics in group C**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Percentage of time CGM was active** | **Mean glucose, mg/dL** | **Glycemic variability (%CV)** | **Glycemic variability (SD), mg/dL** | **Time >250 mg/dL, %** | **Time >180 mg/dL, %** | **Time 70-180 mg/dL, %** | **Time <70 mg/dL, %** | **Time <54 mg/dL, %** |
| **Baseline** | 96.77 (5.02) | 160.14 (27.94) | 25.86 (5.24) | 41.53 (11.70) | 6.19 (11.27) | 26.79 (18.25) | 72.17 (19.31) | 0.37 (1.45) | 0.06 (0.40) |
| **Week 12** | 97.89 (4.99) | 163.59 (39.15) | 25.47 (5.11) | 41.20 (11.08) | 7.97 (15.51) | 30.40 (22.63) | 69.16 (22.39) | 0.43 (1.76) | 0.08 (0.49) |
| **Week 24** | 97.28 (5.69) | 153.08 (28.82) | 25.51 (4.94) | 39.28 (11.12) | 4.54 (9.40) | 23.18 (17.94) | 76.37 (17.87) | 0.45 (1.28) | 0.04 (0.19) |
| **Week 36** | 98.02 (3.83) | 152.48 (25.97) | 25.35 (5.48) | 38.96 (12.07) | 4.01 (6.67) | 23.75 (17.98) | 75.76 (17.72) | 0.55 (1.41) | 0.04 (0.17) |
| **Week 48** | 97.81 (4.86) | 152.66 (29.25) | 24.92 (5.38) | 38.41 (12.21) | 4.48 (7.85) | 23.65 (20.03) | 75.81 (19.69) | 0.60 (1.65) | 0.06 (0.19) |
| **Change from baseline to week 12** | 1.16 (5.98) | 3.30 (27.37) | -0.39 (4.67) | -0.36 (9.16) | 1.73 (9.71) | 3.52 (16.92) | -2.91 (18.09) | 0.06 (2.15) | 0.02 (0.63) |
| *P*-value | **0.0061** | 0.2394 | 0.4409 | 0.4240 | 0.1218 | **0.0461** | 0.0593 | 0.9614 | 0.4518 |
| **Change from baseline to week 24** | 0.49 (6.51) | -7.04 (32.40) | -0.34 (4.72) | -2.22 (10.17) | -1.64 (12.19) | -3.52 (19.29) | 4.10 (19.10) | 0.09 (1.93) | -0.02 (0.44) |
| *P*-value | 0.1363 | **0.0203** | 0.6692 | **0.0439** | 0.1308 | 0.1378 | 0.0835 | 0.5276 | 0.9028 |
| **Change from baseline to week 36** | 1.23 (5.52) | -7.62 (31.70) | -0.47 (4.53) | -2.50 (11.44) | -2.14 (10.65) | -2.95(21.09) | 3.50 (20.93) | 0.18 (1.93) | -0.02 (0.44) |
| *P*-value | **0.0388** | **0.0238** | 0.3273 | **0.0384** | **0.0421** | 0.1510 | 0.1078 | 0.0618 | 0.7576 |
| **Change from baseline to week 48** | 1.21 (5.43) | -7.53 (34.54) | -0.97 (5.03) | -3.16 (12.11) | -1.69 (11.65) | -3.18 (22.77) | 3.68 (22.63) | 0.22 (2.20) | -0.01 (0.45) |
| *P*-value | **0.0099** | **0.0052** | 0.0724 | **0.0055** | **0.0412** | **0.0238** | **0.0179** | 0.1035 | 0.5412 |

Data are the mean (standard deviation) unless stated otherwise. The full analysis set was defined as the modified intention-to-treat population, consisting of all participants with at least one available post-baseline value among those who were randomly assigned.

Abbreviations: CGM, continuous glucose monitoring; CV, coefficient of variation; SD, standard deviation

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**Table S12. Summary of treatment-emergent adverse events (safety analysis population)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Treatment-emergent adverse event** | **Group A (n = 95)** | **Group B (n = 93)** | **Group C (n = 93)** |
| Number of subjects (number of events) | | |
| **Any adverse event** | 33 (47) | 26 (34) | 27(39) |
| Leading to discontinuation | 0 (0) | 0 (0) | 0 (0) |
| Related to trial intervention | 1 (1\*) | 0 (0) | 0 (0) |
| **Any serious adverse event** | 0 (0) | 1 (1†) | 5 (6‡) |
| Leading to death | 0 (0) | 0 (0) | 0 (0) |

\*Hyperglycemia

†Diagnosis with proliferative diabetic retinopathy.

‡These were papillary thyroid cancer diagnosis, prostate biopsy and subsequent prostate carcinoma diagnosis, breast carcinoma diagnosis, osteotomy for hallux valgus correction, and rupture of left knee cartilage.

**Table S13. Rescue therapy by the treatment group**

|  |  |  |  |
| --- | --- | --- | --- |
| **Rescue therapy, n (%)** | **Group A (n=92)** | **Group B (n=91)** | **Group C (n=90)** |
| **From baseline to week 24** | 3 (3.26) | 4 (4.40) | 9 (10.00) |
| **After week 24 to week 48** | 12 (13.04) | 6 (6.59) | 6 (6.67) |

Data are n (%). All *p*-values between groups A versus B, groups A versus C, and groups B versus C were not statistically significant.

**Table S14. Change in medications by treatment group**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **From baseline to week 24** | **Group A** | **Group B** | **Group C** | **Total** |
| ***n*** | **3** | **4** | **9** | **16** |
| At baseline |  |  |  |  |
| Metformin | 3 (100.0) | 4 (100.0) | 9 (100.0) | 16 (100.0) |
| Sulfonylurea | 3 (100.0) | 4 (100.0) | 9 (100.0) | 16 (100.0) |
| DPP4 inhibitor | 2 (66.7) | 0 | 5 (55.6) | 7 (43.8) |
| Thiazolidinedione | 1 (33.3) | 0 | 0 | 1 (6.3) |
| SGLT2 inhibitor | 0 | 1 (25.0) | 5 (55.6) | 6 (37.5) |
| At 24 weeks |  |  |  |  |
| Metformin | 3 (100.0) | 4 (100.0) | 9 (100.0) | 16 (100.0) |
| Dose-escalation in metformin | 0 | 0 | 1 (11.1) | 1 (6.3) |
| Sulfonylurea | 3 (100.0) | 4 (100.0) | 8 (88.9) | 15 (93.8) |
| DPP4 inhibitor | 3 (100.0) | 1 (25.0) | 6 (66.7) | 10 (62.5) |
| Thiazolidinedione | 1 (33.3) | 0 | 0 | 1 (6.25) |
| SGLT2 inhibitor | 2 (66.7) | 3 (75.0) | 3 (33.3) | 8 (50.0) |
| **After week 24 to week 48** | **Group A** | **Group B** | **Group C** | **Total** |
| ***n*** | **12** | **6** | **6** | **24** |
| At 24 weeks |  |  |  |  |
| Metformin | 9 (75.0) | 6 (100.0) | 5 (83.3) | 20 (83.3) |
| Sulfonylurea | 8 (66.7) | 4 (66.7) | 5 (83.3) | 17 (70.8) |
| DPP4 inhibitor | 3 (25.0) | 3 (50.0) | 4 (66.7) | 10 (41.7) |
| Thiazolidinedione | 0 | 2 (33.3) | 2 (33.3) | 4 (16.7) |
| SGLT2 inhibitor | 4 (33.3) | 2 (33.3) | 0 | 6 (25.0) |
| At 48 weeks |  |  |  |  |
| Metformin | 11 (91.7) | 6 (100.0) | 6 (100.0) | 23 (95.8) |
| Dose-escalation in metformin | 2 (16.7) | 1 (16.7) | 0 | 3 (12.5) |
| Sulfonylurea | 9 (75.0) | 6 (100.0) | 5 (83.3) | 20 (83.3) |
| Dose-escalation in sulfonylurea | 0 | 0 | 1 (16.7) | 1 (4.2) |
| DPP4 inhibitor | 5 (41.7) | 3 (50.0) | 4 (66.7) | 12 (50.0) |
| Thiazolidinedione | 0 | 2 (33.3) | 2 (33.3) | 4 (16.7) |
| SGLT2 inhibitor | 5 (41.7) | 2 (33.3) | 0 | 7 (29.2) |

Data are n (%).

Medications were changed only among individuals who received rescue therapy.

Abbreviations: DPP4, dipeptidyl peptidase-4; SGLT2, sodium-glucose cotransporter 2

**Table S15. Number of data inputs at weeks 12, 24, 36, and 48 in groups B and C**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Number (times)** | | **Group B (n = 97)** | **Group C (n = 98)** | ***P*-value**† |
| \*Number (times) of data inputs, total | At week 12 | 31.35 (51.08) | 67.31 (89.01) | **<0.0001** |
| At week 24 | 25.35 (50.32) | 40.02 (57.36) | **0.0009** |
| At week 36 | 17.91 (36.93) | 31.28 (48.42) | **0.0040** |
| At week 48 | 13.92 (34.93) | 26.07 (46.15) | **0.0005** |
| Number (times) of dietary records from photographs of foods | At week 12 | 8.94 (27.30) | 28.20 (63.85) | **<0.0001** |
| At week 24 | 7.99 (30.40) | 18.18 (37.42) | **<0.0001** |
| At week 36 | 5.23 (20.10) | 13.86 (30.25) | **<0.0001** |
| At week 48 | 3.90 (18.12) | 11.09 (30.16) | **<0.0001** |
| Number (times) of glucose measurements with the glucometer | At week 12 | 12.06 (21.40) | 20.67 (18.32) | **<0.0001** |
| At week 24 | 9.28 (18.13) | 14.43 (15.86) | **0.0016** |
| At week 36 | 7.49 (15.29) | 11.38 (14.15) | **0.0089** |
| At week 48 | 5.21 (11.37) | 9.72 (12.97) | **0.0011** |
| Number (times) of blood pressure records from the sphygmomanometer | At week 12 | 5.41 (10.29) | 10.29 (12.94) | **<0.0001** |
| At week 24 | 4.33 (9.66) | 5.37 (9.38) | 0.1614 |
| At week 36 | 2.86 (7.23) | 4.65 (8.96) | 0.0574 |
| At week 48 | 2.70 (8.01) | 3.88 (8.55) | 0.0908 |
| Number (times) of body weight records from the scale with bioelectrical impedance analysis | At week 12 | 5.12 (9.11) | 9.01 (11.31) | **0.0007** |
| At week 24 | 4.41 (8.86) | 4.08 (7.31) | 0.6627 |
| At week 36 | 2.81 (6.45) | 3.51 (7.13) | 0.2913 |
| At week 48 | 2.43 (7.26) | 2.73 (6.42) | 0.2671 |

Data are means (standard deviations) unless stated otherwise.

\*Defined as the number of times data were entered into the healthcare application as photographs of foods or results from the glucometer, sphygmomanometer, or scale with bioelectrical impedance analysis.

†Wilcoxon rank sum test was applied.

**Table S16. Correlations between change in HbA1c from baseline and the sum of the number of data inputs\* in groups B and C**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **n** | **Spearman's correlation coefficient** | ***P*-value\*** |
| **From baseline to week 24†** | 181 | -0.40 | <0.0001 |
| **From baseline to week 48‡** | 181 | -0.31 | <0.0001 |

\*Defined as the number of times data were entered into the healthcare application as photographs of foods or results from the glucometer, sphygmomanometer, or scale with bioelectrical impedance analysis.

†Correlations between change in HbA1c from baseline to week 24 and the sum of the number of data inputs at weeks 12 and 24.

‡Correlations between change in HbA1c from baseline to week 48 and the sum of the number of data inputs at weeks 12, 24, 36 and 48.