Supplementary material

Online Supplemental Material

Newly diagnosed diabetes and outcomes after acute myocardial infarction in young adults

Ding Q, *et al. Heart* 2021; 107:657–666. doi: 10.1136/heartjnl-2020-317101

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eAppendix 1 Patient data collected at baseline

Patient characteristics included: socio-demographics, AMI treatment, clinical, psychosocial and behavioral, and self-reported socioeconomic factors. Use of glucose-lowering medications was assessed through chart review at baseline admission, discharge, and 1-month follow-up. Random blood glucose levels were collected on admission, and peak glucose levels were recorded during hospital stay. HbA1c was extracted from medical records at baseline admission and assessed in all US participants at 1-month with blood samples analyzed at Quest Diagnostics, San Juan Capistrano, CA.

Socio-demographic variables were age, sex, race, Hispanic ethnicity, marital status, education, employment status, and annual household income. Cardiometabolic characteristics were assessed through review of medical records and included body mass index ≥30kg/m^2, random blood glucose (initial and peak), blood pressure, low-density lipoprotein, and triglycerides, cardiovascular disease (CVD) risk factors; other comorbidities included family history of CVD, hypertension, hypercholesterolemia, smoking 30 days before admission, sleep apnea, renal dysfunction, heart failure, stroke, depression, alcohol abuse, prior AMI, and prior primary percutaneous coronary intervention.

AMI treatments assessed at baseline were coronary revascularization (percutaneous coronary intervention/coronary artery bypass grafting), diagnostic angiography, aspirin at arrival, reperfusion therapies, and discharge medications. Non-pharmacological interventions prescribed at discharge were obtained from medical record and included diet counseling, activity guidelines, out-patient cardiac rehab, diabetes education, weight management counseling, smoking cessation counseling and participated in in-patient cardiac rehab program. Clinical characteristics of AMI included coronary occlusion ≥50% as documented by coronary angiography, AMI symptom

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presentation, ST-elevation MI, initial systolic heart rate, peak troponin, Global Registry of Acute Coronary Events risk score, left ventricular ejection fraction <40%, and whether the patient presented to hospital >6 hours after symptom onset. Other clinical characteristics included peak creatinine levels, type of diabetes, self-report treatment for diabetes, and diabetic complications.

Psychosocial and behavioral characteristics assessed at baseline included social support, stress, and depressive symptoms using the 7-item ENRICHD Social Support Instrument, [1] the 14-item Perceived Stress Scale [2] and the 9-item version of the Patient Health Questionnaire, [3] respectively. Physical activity was assessed with the Behavioral Risk Factor Surveillance Survey Physical Activity Instrument.[4] These questionnaires have well-documented reliability and validity.[2, 3, 4]

Self-reported socioeconomic status collected at baseline included health insurance, self-report of difficulty obtaining medical care when needed, medical costs posing an economic burden over the past year, avoiding health care services because of cost, and frequency of not taking prescribed medication because of cost. The above questions are validated measures of financial barriers to health care in AMI patients and were prognostic of worse outcomes.[5] (socio-demographics, AMI treatment, clinical, psychosocial and behavioral and self-reported socioeconomic factors)

eAppendix 2 Details of LME model fitting to explore the association between NDD and health status 1-year post AMI

We constructed a series of linear mixed effects (LME) regression models, with and without adjustment for baseline covariates (socio-demographics, AMI treatment, clinical, psychosocial and behavioral and self-reported socioeconomic factors) to explore the association between NDD and the repeated measurements of health status during the 12 months after AMI, using patients

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with established diabetes as a reference group. For each health status outcome, a separate LME model was fit. The repeated measurements of health status at baseline, 1 month and 12 months were the response variables for each model. The fixed effects in LME models included a dummy variable of diabetes status (NDD vs. established diabetes), two dummy variables of time since baseline (baseline to 1 month and baseline to 12 months), and terms of interactions between diabetes status and time points. Individual-specific random-effects terms were included for intercept and time (to account for the within-person effect of repeated health status measures and the within-person change over time). A follow-up set of models was fit to compare NDD with those without diabetes.

eAppendix 3 Missing data and additional analyses

To ensure that we evaluated a representative cohort of AMI patients with diabetes by accounting for missing-not-at-random, we performed a sensitivity analysis to examine baseline characteristics of patients with diabetes lost to or unavailable for follow-up at 12-months with those who had follow-up data (Online Table 1). Similar baseline characteristics comparisons were performed between patients with and without HbA1c values because we implicitly assumed that if an HbA1c was missing, then the unmeasured value was below the threshold for diabetes diagnosis (Online Table 2). Subgroup analyses were performed to explore the associations of NDD subgroups (HbA1c <8% and HbA1c ≥8%) with health status and clinical outcomes (Online Tables 3, 4, 5). Additional analyses were conducted to assess differences between diabetes groups in self-reported weight changes and whether adoption of weight control led to weight loss by the end of 12-months follow-up. Missing covariates (<5%, except for HbA1c, type of diabetes, self-report treatment for diabetes, and diabetic complications) were imputed to the most

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common category for categorical variables and the median for continuous variables. The use of LME and mixed-effects logistic regression models were sufficient to account for missing responses that are missing-at-random (assuming that the missing observations depend on observed variables but not unobserved variables).[6] All analyses were performed with SAS 9.4. (SAS Institute Inc, Cary, NC), and statistical significance was defined as $p<0.05$ for 2-sided tests. Because of the exploratory nature of this observational study, we did not apply multiplicity correction on an overall statistical significance level to obtain a significance level per test.

eAppendix 4 Summary of baseline characteristics differences between diabetic patients with and without 12-month health status outcomes data

Baseline characteristics of patients with and without follow-up did not differ significantly in age, gender, CVD risk factors, AMI clinical characteristics, AMI treatment, psychosocial and behavioral factors or self-reported socioeconomic status. The remaining baseline characteristics differed significantly between the 2 groups.

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FIGURE LEGENDS:

Supplementary Figure 1: Prevalence of newly diagnosed diabetes in young adults admitted to hospital with AMI

Supplementary Figure 2: Violin plot of HbA1c level distribution for newly diagnosed diabetes

Supplementary Figure 3: Trends of disease-specific and non-disease-specific health status outcomes recovery after AMI in young adults, stratified by diabetes status

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Supplementary Table 1: Comparison of baseline characteristics between diabetic patients with and without 12-month health status outcomes data

Characteristics	**Missing Health Status Outcomes (N=274, 18.4%)**	**Not Missing Health Status Outcomes (N=1219, 81.6%)**	**P-value**
SOCIO-DEMOGRAPHICS			
Age, year (Median, IQR)	48.0 (9.00)	49.0 (8.00)	0.237
Female (%)	191 (69.9%)	888 (72.8%)	0.347
Race			**0.036**
White	184 (67.4%)	909 (74.5%)	
Black	64 (23.4%)	238 (19.5%)	
Others	25 (9.2%)	73 (5.9%)	
Hispanic (Yes/No)	32 (11.7%)	96 (7.9%)	**0.039**
Marital Status			0.303
With Partner (%)	133 (48.7%)	655 (53.7%)	
Without Partner (%)	138 (50.6%)	554 (45.4%)	
Education Status			**0.003**
Less than high school	15 (5.6%)	39 (3.2%)	
Some high school	134 (50.0%)	499 (41.5%)	
More than high school	119 (44.4%)	665 (55.3%)	
Employment Status			**<0.0001**
Working full time	95 (34.8%)	561(45.9%)	
Working part-time	21 (7.7%)	133 (10.9%)	
Not working	157 (57.5%)	526 (43.1%)	

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Household income			0.269
<$30,000	147 (54.2%)	599 (49.1%)	
$30,000-$69,999	64 (23.6%)	337 (27.6%)	
≥$70,000	60 (22.1%)	284 (23.3%)	
CVD RISK FACTORS			
Family history of CVD	185 (68.3%)	925 (75.8%)	**0.029**
History of hypertension	214 (78.4%)	907 (74.3%)	0.163
History of hypercholesterolemia	253 (92.7%)	1101 (90.3%)	0.212
Smoking within last 30 days	170 (62.3%)	674 (55.3%)	**0.036**
Sleep apnea	26 (9.6%)	86 (7.1%)	0.158
Body mass index >30 kg/m^2	162 (59.8%)	780 (63.9%)	0.199
OTHER COMORBIDITIES			
History of renal dysfunction	56 (20.6%)	163 (13.4%)	**0.003**
History of heart failure	41 (15.0%)	70 (5.7%)	**<0.0001**
History of prior stroke/TIA	25 (9.2%)	67 (5.5%)	**0.023**
History of depression	127 (46.5%)	540 (44.3%)	0.498
History of alcohol abuse	18 (6.6%)	61 (5.0%)	0.292
Prior MI	72 (26.4%)	229 (18.8%)	**0.005**
AMI TREATMENT DURING HOSPITALIZATION			
Diagnostic angiography	253 (92.7%)	1159 (95.0%)	0.125
Aspirin at arrival	263 (98.9%)	1155 (97.1%)	0.094
Reperfusion			0.913
Fibrinolytic therapy	14 (5.7%)	58 (5.1%)	

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Primary angioplasty	124 (50.4%)	569 (50.0%)	
Discharge medications			
Aspirin at discharge	260 (97.0%)	1156 (97.7%)	0.485
Statin prescribed	255 (95.9%)	1130 (94.9%)	0.502
Beta-blocker prescribed	246 (95.4%)	1118 (97.1%)	0.141
ACEI or ARB prescribed	183 (74.7%)	855 (82.1%)	0.585
CLINICAL CHARCTERISTICS OF AMI			
AMI symptom presentation			
Typical chest pain	194 (71.1%)	938 (76.9%)	**0.042**
Atypical chest pain	55 (20.2%)	234 (19.2%)	0.715
AMI severity			
ST-segment elevation	130 (47.6%)	604 (49.5%)	0.573
Initial systolic blood pressure (mmHg), median (IQR)	143.5 (42.0)	144.0 (40.0)	0.805
Initial diastolic blood pressure (mmHg), median (IQR)	88.0 (28.5)	86.0 (27.0)	0.169
Initial heart rate, median (IQR)	87.0 (26.0)	85.0 (26.0)	0.086
Peak troponin, median (IQR)	5.5 (19.1)	5.97 (23.6)	0.638
Ejection fraction <40%	49 (18.3%)	130 (11.1%)	**0.001**
Time to presentation >6 hours	128 (47.2%)	571 (47.0%)	0.953
GRACE scores			**0.012**
GRACE 0-99	217 (82.8%)	1073 (89.2%)	
GRACE 100-127	37 (14.1%)	112 (9.3%)	

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GRACE 128-263	8 (3.1%)	18 (1.5%)	
OTHER CLINICAL CHARACTERISTICS			
Baseline HbA1c (%), median (IQR)	8.30 (4.1)	7.70 (4.0)	**0.012**
1-month HbA1c (%), median (IQR)	7.4 (1.7)	7.0 (1.5)	**0.017**
Peak glucose, median (IQR)	241.5 (170.0)	192.0 (162.0)	**<0.0001**
Peak creatinine, median (IQR)	1.0 (0.5)	0.9 (0.3)	**0.022**
Types of Diabetes			**0.002**
Type I	25 (9.2%)	79 (6.5%)	
Type II	158 (57.9%)	584 (47.9%)	
Self-report treatment			
None	23 (8.4%)	82 (6.7%)	0.319
Diet	60 (21.9%)	185 (15.2%)	**0.006**
Insulin	82 (30.0%)	285 (23.4%)	**0.021**
Oral hypoglycemic drugs	86 (31.5%)	359 (29.4%)	0.498
Diabetic Complications			
Kidney disease	29 (10.6%)	51 (4.2%)	**<0.0001**
Retinopathy	13 (4.8%)	56 (4.6%)	0.903
Neuropathy	24 (8.8%)	96 (7.9%)	0.612
Amputation	17 (6.2%)	9 (0.7%)	<0.0001
Other complications	8 (2.9%)	23 (1.9%)	0.274
PSYCHOSOCIAL AND BEHAVIORAL FACTORS			
Social support via ESSI	24.8 (6.16)	25.5 (5.5)	0.096
Stress via PSS	27.1 (9.3)	26.6 (9.9)	0.488

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Depressive symptom via PHQ-9	9.2 (6.9)	8.7 (6.6)	0.326
SELF-REPORTED SOCIOECONOMIC STATUS			
Health insurance			**0.004**
Insured	196 (71.8%)	972 (79.7 %)	
How difficult is it for you to get medical care when needed?			0.139
Extremely difficult	32 (11.8%)	134 (10.9%)	
Some difficult	56 (20.7%)	195 (15.9%)	
Little/not difficult	183 (67.5%)	891 (73.0%)	
Have your medical costs been an economic burden to you over the past year?			0.371
Severe burden	55 (20.3%)	204 (16.7%)	
Some burden	58 (21.4%)	269 (22.1%)	
Little/no burden	158 (58.3%)	747 (61.2%)	
Avoided health-care services due to cost (Yes/No)	100 (36.9%)	439 (35.9%)	0.776
How often have you not taken a medication that your doctor prescribed because of the cost?			0.305
Always	19 (7.0%)	63 (5.2%)	
Sometimes	61 (22.5%)	248 (20.3%)	
Rarely to never	191 (69.7%)	909 (74.5%)	

Abbreviations: ACEIs = angiotensin converting enzyme inhibitors; ARBs = angiotensin receptor blockers; BMI = body mass index; CVD = cardiovascular disease; ESSI = ENRICHD social support instrument; GRACE = Global registry of acute coronary events; IQR = interquartile range; MI = myocardial infarction; PCI = percutaneous coronary intervention; PHQ-9 = patient health questionnaire-9; PSS = perceived stress scale; SD = standard deviation; TIA = transient ischemic attack

P-values numbers in bold denote statistical significance at the $p < 0.05$ level.

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Supplementary Table 2: Comparison of baseline characteristics between AMI patients with and without missing values of HbA1c (baseline and/or 1-month)

Characteristics	**HbA1c Missing AMI Patients (N=745, 21.28%)**	**No Missing HbA1c AMI Patients (N=2756, 78.72%)**	**P-value**
SOCIO-DEMOGRAPHICS			
Age, year (Median, IQR)	45.9 (9.00)	47.3 (8.00)	**0.0049**
Female (%)	251 (33.7%)	901 (32.7%)	0.6066
Race			0.1866
White	601 (80.7%)	2141 (77.7%)	
Black	107 (14.4%)	443 (16.1%)	
Others	37 (4.9%)	172 (6.2%)	
Hispanic (Yes/No)	53 (7.1%)	216 (7.8%)	0.5107
Marital Status			0.1123
With partner (%)	446 (59.9%)	1583 (57.4%)	
Without partner (%)	287 (38.5%)	1147 (41.6%)	
Unknown	12 (1.6%)	26 (0.9%)	
Education Status			**<0.0001**
Less than high school	90 (12.6%)	95 (3.5%)	
Some high school	336 (47.1%)	1081 (39.7%)	
More than high school	287 (40.3%)	1545 (56.8%)	
Employment Status			0.4052
Working full time	364 (48.9%)	1423 (51.6%)	
Working part-time	82 (11.0%)	288 (10.5%)	

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Not working	299 (40.1%)	1045 (37.92%)	
Household income			**0.0014**
<$30,000	345 (46.4%)	1163 (42.2%)	
$30,000-$69,999	232 (31.2%)	788 (28.6%)	
≥$70,000	167 (22.5%)	803 (29.2%)	
CVD RISK FACTORS			
Family history of CVD	487 (65.5%)	2018 (73.3%)	**<0.0001**
History of hypertension	420 (56.4%)	1797 (65.2%)	**<0.0001**
History of hypercholesterolemia	620 (83.2%)	2382 (86.4%)	**0.0263**
Smoking within last 30 days	518 (69.6%)	1567 (56.9%)	**<0.0001**
Sleep apnea	18 (2.4%)	143 (5.2%)	**0.0013**
Body mass index >30 kg/m^{2x}	282 (38.1%)	1427 (51.8%)	**<0.0001**
OTHER COMORBIDITIES			
History of renal dysfunction	66 (8.9%)	296 (10.8%)	0.1409
History of heart failure	24 (3.2%)	117 (4.3%)	0.2067
History of prior stroke/TIA	24 (3.2%)	123 (4.5%)	0.1334
History of depression	272 (36.5%)	1126 (40.8%)	**0.0311**
History of alcohol abuse	63 (8.5%)	168 (6.1%)	**0.0221**
Prior MI	98 (13.2%)	445 (16.2%)	**0.0453**
Prior PCI	78 (10.5%)	430 (15.6%)	**0.0004**
AMI TREATMENT DURING HOSPITALIZATION			
Coronary revascularization (PCI/CABG)	591 (79.3%)	2260 (82.0%)	0.0958

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Diagnostic angiography	703 (94.4%)	2609 (94.7%)	0.7448
Aspirin at arrival	715 (97.15%)	2642 (97.7%)	0.3797
Reperfusion			**0.0165**
Fibrinolytic therapy	59 (8.4%)	140 (5.5%)	
Primary angioplasty	355 (50.6%)	1334 (52.3%)	
Not received	287 (40.9%)	1077 (42.2%)	
Discharge medications			
Aspirin at discharge	716 (97.9%)	2658 (98.1%)	0.8672
Statin prescribed	686 (94.1%)	2526 (94.1%)	0.9905
Beta-blocker prescribed	643 (92.5%)	2500 (96.7%)	**<0.0001**
ACEI or ARB prescribed	468 (68.0%)	1763 (70.8%)	0.1539
CLINICAL CHARCTERISTICS OF AMI			
Coronary occlusion ≥50% (documented by coronary angiography)			0.6619
Yes	621 (83.4%)	2306 (83.7%)	
No	76 (10.2%)	274 (9.9%)	
Unknown	48 (6.4%)	176 (6.4%)	
AMI symptom presentation			
Typical chest pain	632 (84.8%)	2141 (77.7%)	**<0.0001**
Atypical chest pain	98 (13.2%)	526 (19.1%)	**0.0002**
AMI severity			
ST-segment elevation	421 (56.5%)	1390 (50.4%)	**0.0032**

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Initial systolic blood pressure, median (IQR)	139.0 (41.0)	142.0 (37.0)	**0.0037**
Initial diastolic blood pressure, median (IQR)	85.0 (26.0)	87.0 (25.0)	0.3664
Initial heart rate, median (IQR)	80.0 (23.0)	81.0 (25.0)	0.1356
Peak troponin, median (IQR)	9.8 (38.1)	6.6 (24.8)	**0.0002**
Ejection fraction <40%	75 (10.4%)	293 (10.9%)	0.6569
Time to presentation >6 hours	277 (37.3%)	1189 (43.3%)	**0.0035**
GRACE scores			**0.0316**
GRACE 0-99	680 (93.8%)	2456 (90.7%)	
GRACE 100-127	39 (5.4%)	222 (8.2%)	
GRACE 128-263	6 (0.8%)	29 (1.1%)	
OTHER CLINICAL CHARACTERISTICS			
Baseline HbA1c (%), median (IQR)	NA	7.70 (4.0)	
1-month HbA1c (%), median (IQR)	NA	7.0 (1.5)	
Initial glucose, median (IQR)	119.0 (44.0)	132.0 (73.0)	**<0.0001**
Peak glucose, median (IQR)	130.0 (49.0)	145.0 (92.0)	**<0.0001**
Peak creatinine, median (IQR)	0.9 (0.3)	0.9 (0.3)	0.8610
Types of Diabetes			**<0.0001**
Type I	19 (2.6%)	85 (3.1%)	
Type II	70 (9.4%)	672 (24.4%)	
Unknown	656 (88.1%)	1999 (72.5%)	
Self-report treatment			

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None	12 (1.6%)	93 (3.4%)	**0.012**
Diet	25 (3.3%)	220 (7.9%)	**0.0001**
Insulin	37 (4.9%)	330 (11.9%)	**0.0001**
Oral hypoglycemic drugs	48 (6.4%)	397 (14.4%)	**<0.0001**
Unknown	623 (83.6%)	1716 (62.3%)	
Diabetic Complications			
Kidney disease	10 (1.3%)	70 (2.5%)	0.0523
Retinopathy	5 (0.7%)	64 (2.3%)	**0.004**
Neuropathy	11 (1.5%)	109 (3.9%)	**0.001**
Amputation	5 (0.7%)	21 (0.8%)	0.798
Other complications	2 (0.2%)	29 (1.1%)	0.0428
Unknown	712 (95.6%)	2463 (89.4%)	
PSYCHOSOCIAL AND BEHAVIORAL FACTORS			
Social support via ESSI	24.8 (6.16)	25.5 (5.5)	0.096
Stress via PSS	27.1 (9.3)	26.6 (9.9)	0.488
Depressive symptom via PHQ-9	9.2 (6.9)	8.7 (6.6)	0.326
Physical activity			**<0.0001**
Physically active	244 (33.2%)	1002 (36.7%)	
Insufficient activity	169 (23.0%)	774 (28.4%)	
Inactivity	321 (43.7%)	954 (34.9%)	
SELF-REPORTED SOCIOECONOMIC STATUS			
Health insurance			**0.0001**
Insured	633 (84.9%)	2166 (78.6 %)	

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How difficult is it for you to get medical care when needed?			0.1114
Extremely difficult	57 (7.7%)	281 (10.2%)	
Some difficult	124 (16.7%)	437 (15.9%)	
Little/not difficult	563 (75.7%)	2036 (73.9%)	
Have your medical costs been an economic burden to you over the past year?			**<0.0001**
Severe burden	74 (9.9%)	392 (14.2%)	
Some burden	113 (15.2%)	566 (20.6%)	
Little/no burden	557 (74.9%)	1796 (65.2%)	
Avoided health-care services due to cost (Yes/No)	152 (20.4%)	904 (32.8%)	**<0.0001**
How often have you not taken a medication that your doctor prescribed because of the cost?			**0.0064**
Always	24 (3.2%)	125 (4.5%)	
Sometimes	96 (12.9%)	464 (16.9%)	
Rarely to never	624 (83.9%)	2165 (78.6%)	

Abbreviations: ACEIs = angiotensin converting enzyme inhibitors; ARBs = angiotensin receptor blockers; BMI = body mass index; CABG = coronary artery bypass grafting; CVD = cardiovascular disease; ESSI = ENRICHD social support instrument; GRACE = Global registry of acute coronary events; IQR = interquartile range; MI = myocardial infarction; PCI = percutaneous coronary intervention; PHQ-9 = patient health questionnaire-9; PSS = perceived stress scale; SD = standard deviation; TIA = transient ischemic attack.

P-value numbers in bold denote statistical significance at $p<0.05$ level.

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Supplementary Table 3: Health Status Outcomes Stratified by NDD Subgroups

Health Status Outcomes	**NDD (HbA1c ≥8) (N=47) Mean (SD) (a)**	**NDD (6.5≤ HbA1c <8) (N=435) Mean (SD) (b)**	**Without Diabetes (N=2008) Mean (SD) (c)**	**Established Diabetes (N=985) Mean (SD) (d)**	**P-Value* (a) vs. (c)**	**P-Value† (a) vs. (d)**	**P-Value‡ (b) vs. (c)**	**P-Value§ (b) vs. (d)**
Baseline								
SAQ-Angina Frequency	87.87 (15.73)	85.30 (18.22)	85.84 (18.94)	79.33 (23.73)	0.465	**0.008**	0.059	**<0.0001**
SAQ-Physical Limitations	83.18 (26.85)	82.41 (24.63)	84.56 (22.93)	73.77 (28.72)	0.688	**0.029**	0.084	**<0.0001**
SAQ-Quality of Life	61.35 (22.21)	60.52 (25.73)	57.48 (22.84)	52.94 (25.25)	0.251	**0.025**	**0.024**	**<0.0001**
SF-12 Mental Functioning	46.72 (12.11)	45.41 (12.18)	46.36 (12.37)	43.21 (12.81)	0.849	0.069	0.155	**0.003**
SF-12 Physical Functioning	46.03 (11.63)	44.24 (11.87)	45.84 (11.65)	39.71 (12.06)	0.914	**0.001**	**0.012**	**<0.0001**
EQ-5D-VAS	62.55 (21.75)	67.55 (21.07)	66.34 (20.62)	58.49 (22.27)	0.228	0.237	0.282	**<0.0001**
1-Month Follow-Up								

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SAQ-Angina Frequency	94.32 (12.83)	88.95 (18.20)	89.51 (17.27)	87.39 (18.53)	**0.019**	**0.014**	0.058	0.151
SAQ-Physical Limitations	88.13 (20.04)	91.48 (18.04)	89.90 (19.09)	88.91 (20.94)	0.544	0.081	0.124	**0.024**
SAQ-Quality of Life	71.97 (21.87)	71.51 (24.50)	67.94 (24.57)	66.39 (26.40)	0.284	0.162	**0.008**	**0.001**
SF-12 Mental Functioning	51.91 (10.07)	51.68 (9.41)	49.61 (10.85)	48.61 (11.21)	0.174	0.062	**0.001**	**<0.0001**
SF-12 Physical Functioning	41.39 (11.94)	42.43 (11.60)	43.51 (11.28)	38.10 (11.75)	0.229	0.078	0.089	**<0.0001**
EQ-5D-VAS	64.39 (20.63)	72.99 (19.42)	71.75 (20.09)	67.37 (22.40)	**0.016**	0.386	0.254	**<0.0001**
12-Month Follow-Up								
SAQ-Angina Frequency	93.82 (11.29)	92.28 (14.74)	92.06 (16.03)	89.21 (19.12)	0.378	**0.030**	0.793	**0.003**
SAQ-Physical Limitations	89.22 (18.79)	93.74 (15.72)	91.87 (17.98)	89.79 (20.94)	0.395	0.863	**0.041**	**0.001**
SAQ-Quality of Life	71.57 (23.22)	76.39 (21.87)	72.23 (22.51)	70.32 (24.88)	0.866	0.775	**0.001**	**<0.0001**

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SF-12 Mental Functioning	52.80 (10.74)	51.28 (9.62)	50.61 (10.80)	48.81 (11.79)	0.243	0.054	0.237	**0.001**
SF-12 Physical Functioning	44.43 (12.91)	45.28 (12.08)	46.14 (11.55)	40.61 (12.83)	0.395	0.089	0.203	**<0.0001**
EQ-5D-VAS	68.62 (20.54)	76.60 (18.07)	73.61 (20.22)	68.55 (22.87)	0.169	0.987	**0.001**	**<0.0001**

*=P-values were testing for health status outcomes differences between NDD patients with HbA1c ≥8 and those without diabetes.
†=P-values were testing for health status outcomes differences between NDD patients with HbA1c ≥8 and those with established diabetes.
‡=P-values were testing for health status outcomes differences between NDD patients with HbA1c <8 and those without diabetes.
§=P-values were testing for health status outcomes differences between NDD patients with HbA1c <8 and those with established diabetes.

Abbreviations: EQ-5D-VAS = Euro-Quality of Life Visual Analog Scale; NDD = newly diagnosed diabetes; SAQ = Seattle Angina Questionnaire; SF-12 = 12-Item Short Form Health Survey

P-values numbers in bold denote statistical significance at the p<0.05 level.

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Supplementary material

Supplementary Table 4: Mortality and in-hospital medical complications after AMI stratified by NDD subgroups

Clinical Outcomes	**NDD (HbA1c ≥8) (N=47) (a)**	**NDD (6.5≤ HbA1c <8) (N=435) (b)**	**Without Diabetes (N=2008) (c)**	**Established Diabetes (N=985) (d)**	**P-Value*** **(a) vs. (c)**	**P-Value †** **(a) vs. (d)**	**P-Value ‡** **(b) vs. (c)**	**P-Value §** **(b) vs. (d)**
Mortality								
In-hospital mortality	0	0	1 (0.1%)	3 (0.3%)	0.999	0.999	0.999	0.557
30-day mortality	0	0	12 (0.6%)	9 (0.9%)	0.999	0.999	0.126	0.102
1-year mortality	0	5 (1.2%)	32 (1.6%)	35 (3.6%)	0.822	0.519	**0.029**	**0.003**
In-Hospital Medical Complications								
Re-infarction	2 (4.3%)	4 (0.9%)	28 (1.4%)	9 (0.9%)	0.131	**0.033**	0.868	0.815
Heart failure	3 (6.4%)	30 (6.9%)	109 (5.4%)	97 (9.9%)	0.829	0.759	0.269	0.154
Cardiac arrhythmias	2 (4.3%)	26 (5.9%)	151 (7.5%)	65 (6.6%)	0.664	0.845	0.526	0.680
Stroke/Transient ischemic attack	0	1 (0.2%)	6 (0.3%)	4 (0.4%)	0.999	0.569	0.889	0.999
Hemorrhagic	6 (12.8%)	26 (5.9%)	153 (7.6%)	80 (8.1%)	0.281	0.078	0.455	0.281

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complications				

*=P-values were testing for clinical outcomes differences between NDD patients with HbA1c ≥8 and those without diabetes. Fisher exact for cells <5.
†=P-values were testing for clinical outcomes differences between NDD patients with HbA1c ≥8 and those with established diabetes. Fisher exact for cells <5.
‡=P-values were testing for clinical outcomes differences between NDD patients with HbA1c <8 and those without diabetes. Fisher exact for cells <5.
§=P-values were testing for clinical outcomes differences between NDD patients with HbA1c <8 and those with established diabetes. Fisher exact for cells <5.

Abbreviations: NDD = newly diagnosed diabetes
P-values numbers in bold denote statistical significance at the p<0.05 level.

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Supplementary material

Supplementary Table 5: Parameter estimates and P-values from the mixed effects models describing the relationship between newly diagnosed diabetes subgroups and health status outcomes

Health Status Outcomes	Reference Group	Estimate (Unadjusted models)	95% Confidence Intervals	P-Value	Estimate (Adjusted models*)	95% Confidence Intervals	P-Value
SAQ-Angina Frequency							
Newly diagnosed diabetes HbA1c ≥8	Without diabetes	2.81	-1.00 to 6.63	0.149	1.75	-2.12 to 5.62	0.376
Newly diagnosed diabetes HbA1c ≥8	Established diabetes	6.67	2.22 to 11.11	**0.003**	1.25	-3.01 to 5.52	0.564
Newly diagnosed diabetes HbA1c <8	Without diabetes	-0.20	-1.52 to 1.11	0.7616	0.29	-0.96 to 1.53	0.653
Newly diagnosed diabetes HbA1c <8	Established diabetes	3.49	1.89 to 5.10	**<0.0001**	1.30	-0.47 to 3.08	0.149
SAQ-Physical Limitations							
Newly diagnosed diabetes HbA1c ≥8	Without diabetes	-1.45	-6.01 to 3.12	0.535	-1.31	-5.74 to 3.13	0.5635
Newly diagnosed diabetes HbA1c ≥8	Established diabetes	1.75	-3.39 to 6.89	0.504	4.86	-3.07 to 12.79	0.2291

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Newly diagnosed diabetes HbA1c <8	Without diabetes	0.99	-0.55 to 2.53	0.209	-1.24	-3.49 to 1.01	0.2800
Newly diagnosed diabetes HbA1c <8	Established diabetes	4.52	2.71 to 6.33	**<0.0001**	5.47	2.40 to 8.54	**0.0005**
SAQ-Quality of Life							
Newly diagnosed diabetes HbA1c ≥8	Without diabetes	3.16	-2.26 to 8.59	0.253	2.19	-2.98 to 7.37	0.4065
Newly diagnosed diabetes HbA1c ≥8	Established diabetes	6.21	0.25 to 12.2	**0.041**	1.20	-4.27 to 6.68	0.667
Newly diagnosed diabetes HbA1c <8	Without diabetes	3.47	1.56 to 5.39	**0.0004**	3.46	1.77 to 5.17	**<0.0001**
Newly diagnosed diabetes HbA1c <8	Established diabetes	6.64	4.41 to 8.86	**<0.0001**	2.78	0.45 to 5.11	**0.019**
SF-12 Mental Functioning							
Newly diagnosed diabetes HbA1c ≥8	Without diabetes	1.92	-0.82 to 4.66	0.169	0.84	-1.36 to 3.04	0.455

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Newly diagnosed diabetes HbA1c ≥8	Established diabetes	3.79	0.92 to 6.66	**0.009**	0.75	-1.38 to 2.88	0.488
Newly diagnosed diabetes HbA1c <8	Without diabetes	0.89	-0.05 to 1.85	0.063	-0.76	-1.80 to 0.28	0.150
Newly diagnosed diabetes HbA1c <8	Established diabetes	2.77	1.72 to 3.81	**<0.0001**	0.31	-0.59 to 1.21	0.508
SF-12 Physical Functioning							
Newly diagnosed diabetes HbA1c ≥8	Without diabetes	-1.20	-4.04 to 1.64	0.407	-0.67	-3.25 to 1.92	0.612
Newly diagnosed diabetes HbA1c ≥8	Established diabetes	4.56	1.45 to 7.67	**0.004**	-0.03	-2.67 to 2.62	0.984
Newly diagnosed diabetes HbA1c <8	Without diabetes	-1.21	-2.22 to -0.19	**0.019**	-0.25	-1.11 to 0.61	0.569
Newly diagnosed diabetes HbA1c <8	Established diabetes	4.53	3.35 to 5.71	**<0.0001**	0.59	-0.57 to 1.75	0.319
EQ-5D Visual Analogue Scale							

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Newly diagnosed diabetes HbA1c ≥8	Without diabetes	-5.25	-10.0 to 0.48	**0.031**	-4.87	-9.44 to -0.29	**0.037**
Newly diagnosed diabetes HbA1c ≥8	Established diabetes	0.78	-4.64 to 6.21	0.777	-4.10	-9.17 to 0.96	0.112
Newly diagnosed diabetes HbA1c <8	Without diabetes	1.71	0.05 to 3.37	**0.044**	1.99	0.49 to 3.48	**0.009**
Newly diagnosed diabetes HbA1c <8	Established diabetes	7.69	5.73 to 9.66	**<0.0001**	3.21	1.09 to 5.33	**0.003**

Abbreviations: EQ-5D-VAS = Euro-Quality of Life Visual Analogue Scale; SAQ = Seattle Angina Questionnaire; SF-12 = 12-Item Short Form Health Survey
P-values marked in bold denote statistical significance at the p<0.05 level.

Supplementary material

Supplementary Table 6: P-values for interactions between newly diagnosed diabetes subgroups and time in the fully adjusted linear mixed effects models

Post-AMI health outcomes (baseline, 1-month & 12-months)	**P-value**
Newly Diagnosed Diabetes HbA1c ≥8% vs. No Diabetes	
SAQ-Angina Frequency Scores	
Newly diagnosed diabetes HbA1c ≥8%*time2 interaction	0.4365
Newly diagnosed diabetes HbA1c ≥8%*time3 interaction	0.8564
SAQ-Physical Limitations	
Newly diagnosed diabetes HbA1c ≥8%*time2 interaction	0.8196
Newly diagnosed diabetes HbA1c ≥8%*time3 interaction	0.8367
SAQ-Quality of Life	
Newly diagnosed diabetes HbA1c ≥8%*time2 interaction	0.8487
Newly diagnosed diabetes HbA1c ≥8%*time3 interaction	0.2614
SF-12 Mental Functioning	
Newly diagnosed diabetes HbA1c ≥8%*time2 interaction	0.3982
Newly diagnosed diabetes HbA1c ≥8%*time3 interaction	0.4809
SF-12 Physical Functioning	

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Newly diagnosed diabetes HbA1c ≥8%*time2 interaction	0.2143
Newly diagnosed diabetes HbA1c ≥8%*time3 interaction	0.4112
EQ-5D Visual Analogue Scale	
Newly diagnosed diabetes HbA1c ≥8%*time2 interaction	0.2847
Newly diagnosed diabetes HbA1c ≥8%*time3 interaction	0.7516
Newly Diagnosed Diabetes HbA1c ≥8% vs. Established Diabetes	
SAQ-Angina Frequency Scores	
Newly diagnosed diabetes HbA1c ≥8%*time2 interaction	0.5699
Newly diagnosed diabetes HbA1c ≥8%*time3 interaction	0.3091
SAQ-Physical Limitations	
Newly diagnosed diabetes HbA1c ≥8%*time2 interaction	**0.0219**
Newly diagnosed diabetes HbA1c ≥8%*time3 interaction	0.0648
SAQ-Quality of Life	
Newly diagnosed diabetes HbA1c ≥8%*time2 interaction	0.3472
Newly diagnosed diabetes HbA1c ≥8%*time3 interaction	0.1107
SF-12 Mental Functioning	

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Newly diagnosed diabetes HbA1c ≥8%*time2 interaction	0.8504
Newly diagnosed diabetes HbA1c ≥8%*time3 interaction	0.8983
SF-12 Physical Functioning	
Newly diagnosed diabetes HbA1c ≥8%*time2 interaction	0.0771
Newly diagnosed diabetes HbA1c ≥8%*time3 interaction	0.2923
EQ-5D Visual Analogue Scale	
Newly diagnosed diabetes HbA1c ≥8%*time2 interaction	**0.0465**
Newly diagnosed diabetes HbA1c ≥8%*time3 interaction	0.3579
Newly Diagnosed Diabetes HbA1c <8% vs. No diabetes	
SAQ-Angina Frequency Scores	
Newly Diagnosed Diabetes HbA1c <8%*time2 interaction	0.9969
Newly Diagnosed Diabetes HbA1c <8%*time3 interaction	0.6595
SAQ-Physical Limitations	
Newly Diagnosed Diabetes HbA1c <8%*time2 interaction	**0.0126**
Newly Diagnosed Diabetes HbA1c <8%*time3 interaction	**0.0092**
SAQ-Quality of Life	

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Newly Diagnosed Diabetes HbA1c <8%*time2 interaction	0.6480
Newly Diagnosed Diabetes HbA1c <8%*time3 interaction	0.5222
SF-12 Mental Functioning	
Newly Diagnosed Diabetes HbA1c <8%*time2 interaction	**<0.0001**
Newly Diagnosed Diabetes HbA1c <8%*time3 interaction	**0.0350**
SF-12 Physical Functioning	
Newly Diagnosed Diabetes HbA1c <8%*time2 interaction	0.4923
Newly Diagnosed Diabetes HbA1c <8%*time3 interaction	0.5369
EQ-5D Visual Analogue Scale	
Newly Diagnosed Diabetes HbA1c <8%*time2 interaction	0.9700
Newly Diagnosed Diabetes HbA1c <8%*time3 interaction	0.2111
Newly Diagnosed Diabetes HbA1c <8% vs. Established Diabetes	
SAQ-Angina Frequency Scores	
Newly Diagnosed Diabetes HbA1c <8%*time2 interaction	**0.0009**
Newly Diagnosed Diabetes HbA1c <8%*time3 interaction	**0.0251**
SAQ-Physical Limitations	

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Newly Diagnosed Diabetes HbA1c <8%*time2 interaction	**0.0004**
Newly Diagnosed Diabetes HbA1c <8%*time3 interaction	**0.0065**
SAQ-Quality of Life	
Newly Diagnosed Diabetes HbA1c <8%*time2 interaction	0.1085
Newly Diagnosed Diabetes HbA1c <8%*time3 interaction	0.3087
SF-12 Mental Functioning	
Newly Diagnosed Diabetes HbA1c <8%*time2 interaction	0.2410
Newly Diagnosed Diabetes HbA1c <8%*time3 interaction	0.6515
SF-12 Physical Functioning	
Newly Diagnosed Diabetes HbA1c <8%*time2 interaction	0.4914
Newly Diagnosed Diabetes HbA1c <8%*time3 interaction	0.9131
EQ-5D Visual Analogue Scale	
Newly Diagnosed Diabetes HbA1c <8%*time2 interaction	**0.0114**
Newly Diagnosed Diabetes HbA1c <8%*time3 interaction	0.5387

Abbreviations: EQ-5D = Euro-Quality of Visual Analogue Scale; SAQ = Seattle Angina Questionnaire; SF-12 = 12-Item Short Form Survey; Time2=indicator of the 1-month follow-up time point; Time3=indicator of the 12-months follow-up time point. P-values marked in bold denote statistical significance at the $p<0.05$ level.

Supplementary material

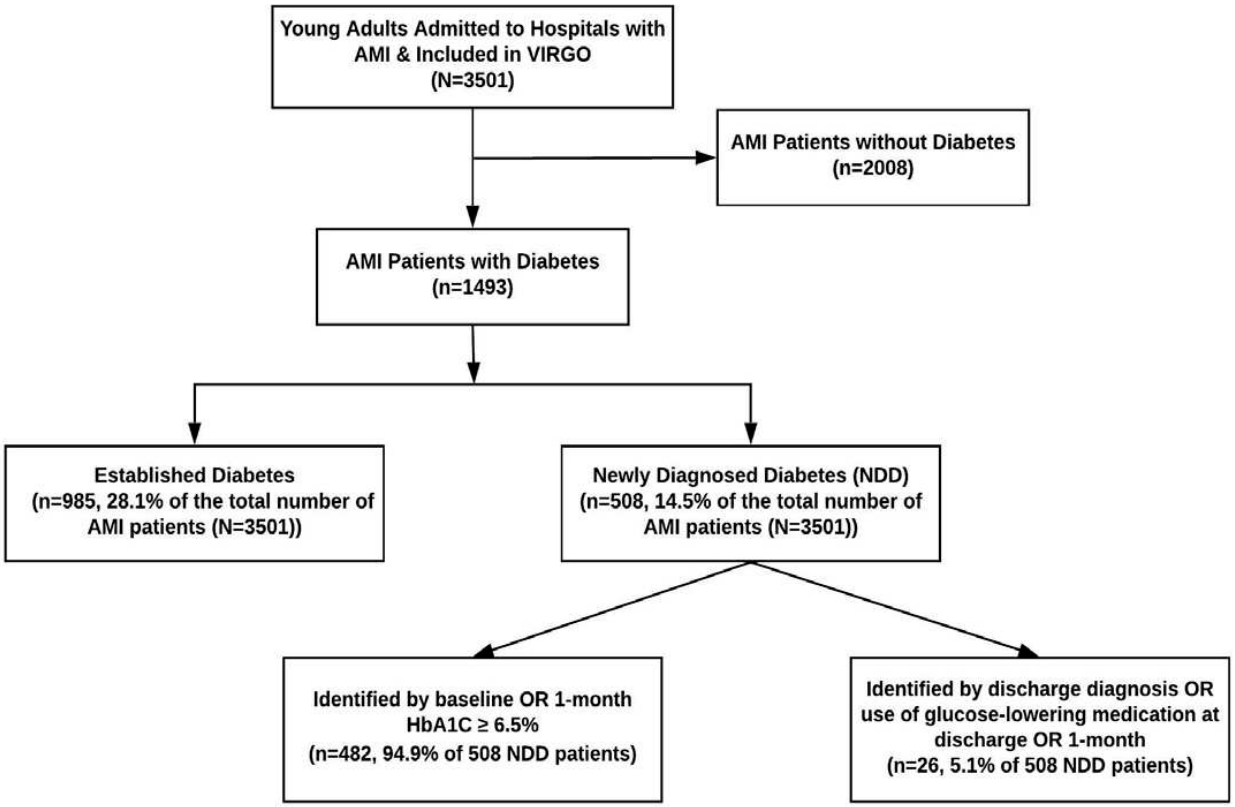
Supplementary Table 7: Self-reported weight changes during 12-month follow-up, stratified by diabetes status

Self-reported weight changes during 12-month follow-up	**Without Diabetes (N=2008, 57.36%) (a)**	**Newly Diagnosed Diabetes (N=508, 14.51%) (b)**	**Established Diabetes (N=985, 28.13%) (c)**	**P-value (b) vs. (a)**	**P-value (b) vs. (c)**
Gain weight	620 (30.9%)	150 (29.5%)	265 (26.9%)	0.556	0.2836
Lost weight	508 (25.3%)	157 (30.9%)	282 (28.6%)	**0.0105**	0.3604
No change	416 (20.7%)	117 (23.0%)	166 (16.9%)	0.2541	**0.0039**
Unknown	31 (1.5%)	8 (1.6%)	20 (2.0%)	0.959	0.5386
Among AMI patients who had received weight management counseling at discharge					
Self-reported weight changes during 12-month follow-up	**Without Diabetes (n=753, 37.5% out of 2008) (a)**	**Newly Diagnosed Diabetes (n=195, 38.4% out of 508) (b)**	**Established Diabetes (n=427, 43.4% out of 985) (c)**	**P-value (b) vs. (a)**	**P-value (b) vs. (c)**
Gain weight	219 (29.1%)	58 (29.7%)	118 (27.6%)	0.8567	0.588
Lost weight	196 (26.0%)	63 (32.3%)	129 (30.2%)	0.0795	0.599
No change	158 (20.9%)	44 (22.6%)	63 (14.8%)	0.6308	**0.016**
Unknown	9 (1.2%)	4 (2.1%)	4 (0.9%)	0.3596	0.2525

*P-values in bold denote statistical significance at the $p<0.05$ level

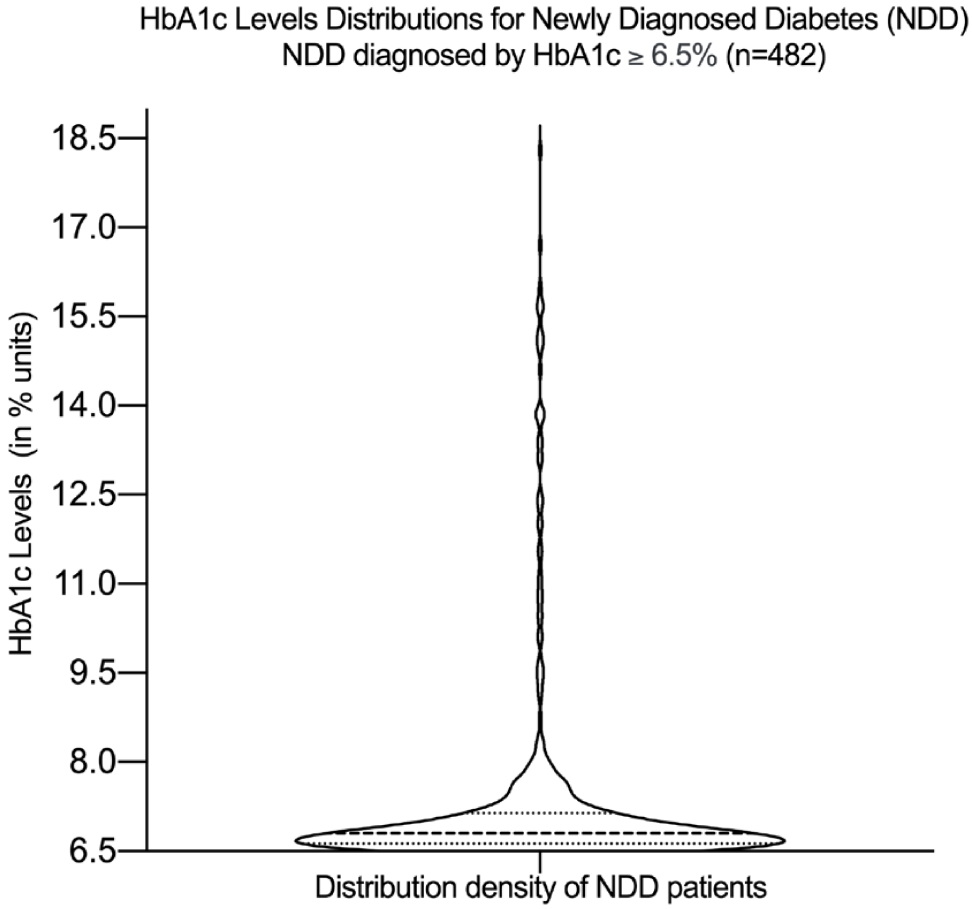
Supplementary material

Supplementary Figure 1:



Supplementary material

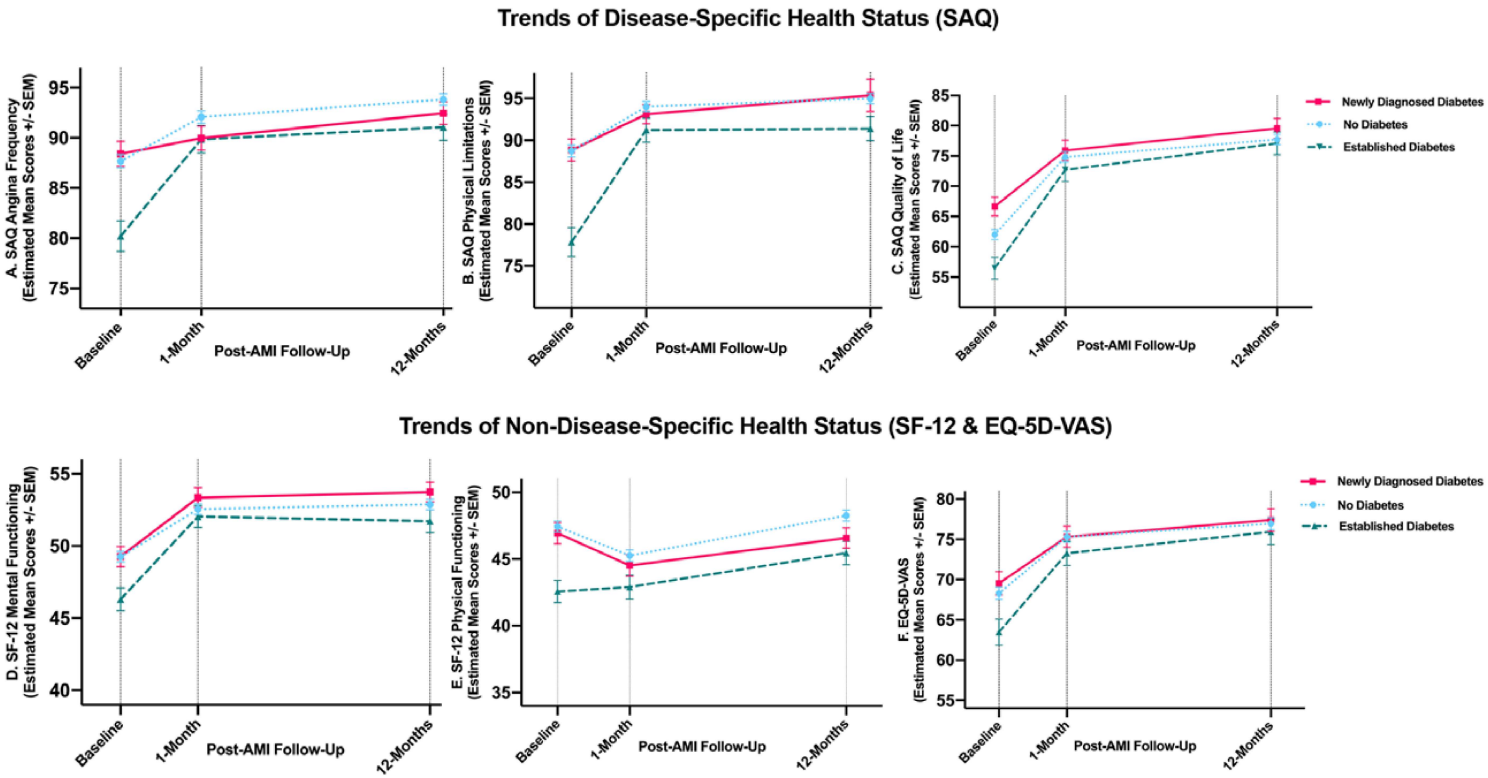
Supplementary Figure 2:



Note: median is shown with a dashed line, first and third quantiles are shown dotted lines. The first quantile is below the dashed line and the third quantile is above the dashed line.

Supplementary material

Supplementary Figure 3:



Supplementary material

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