

Supplemental Material

A Systematic Literature Review of Psychological Interventions for Adults with Type 1 Diabetes

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SUPPLEMENTAL MATERIAL

Table S1. Embase Search Strategy

No.	Keywords
1	exp insulin dependent diabetes mellitus/ or (type 1 diabet\$ or type I diabet\$ or t1dm or insulin-dependent diabet\$ or IDDM).ti,ab.
2	exp psychotherapy/ or exp telemedicine/
3	motivational interviewing/
4	motivational interview\$.ti,ab,kw.
5	exp solution-focused therapy/
6	(SFBT or solution-focused brief therapy or short-term solution focus therapy or short-term solution focused therapy or solution focus brief therapy or solution focus therapy or solution-focused brief therapy or solution-focused treatment).ti,ab,kw.
7	exp cognitive behavioral therapy/
8	(cognitive behavio?ral therap\$ or cognitive behavio?r therap\$ or CBT).ti,ab,kw.
9	cognitive restructur\$.ti,ab,kw.
10	cognitive therapy/
11	(mindfulness-based cognitive therapy or mindful cognitive therapy or MBCT).ti,ab,kw.
12	(behavio?ral family systems therapy or BFST).ti,ab,kw.
13	multisystemic therapy.ti,ab,kw.
14	exp psychodynamics/
15	psychodynamic\$.ti,ab,kw.
16	(behavio?ral adj2 (therapy or intervention)).ti,ab,kw.
17	(non-directive support counseling or NDC).ti,ab,kw.
18	(psychologic\$ or psychological intervention\$ or psycho-intervention or counsel\$).ti,ab,kw.
19	or/2-18
20	(face-to-face or F2F or in-person or telemedicine or virtual or online or skype or zoom or mhealth or mobile health or smartphone or smart-phone or application\$ or connected health or digital or mobile app\$).ti,ab,kw.
21	1 and (19 or 20)
22	Clinical Trial/
23	Randomized Controlled Trial/
24	controlled clinical trial/
25	multicenter study/
26	Phase 3 clinical trial/
27	Phase 4 clinical trial/
28	exp RANDOMIZATION/
29	Single Blind Procedure/
30	Double Blind Procedure/
31	Crossover Procedure/

No.	Keywords
32	PLACEBO/
33	randomi?ed controlled trial\$.tw.
34	rct.tw.
35	(random\$ adj2 allocat\$).tw.
36	single blind\$.tw.
37	double blind\$.tw.
38	((treble or triple) adj blind\$).tw.
39	placebo\$.tw.
40	Prospective Study/
41	or/22-40
42	Case Study/
43	case report.tw.
44	abstract report/ or letter/
45	Conference proceeding.pt.
46	Conference abstract.pt.
47	Editorial.pt.
48	Letter.pt.
49	Note.pt.
50	or/42-49
51	41 not 50
52	21 and 51
53	52 not ((exp animal/ or nonhuman/) not exp human/)
54	limit 53 to english language
55	limit 54 to yr="2001 -Current"

Table S2. Eligibility Criteria

PICOS	Inclusion Criteria	Exclusion Criteria
Population	- Adults (≥ 18 years) with T1DM - Mixed populations of patients (e.g., by disease type or age group) with results reported separately for the population of interest	- Studies evaluating population with condition other than T1DM (e.g., T2DM, gestational diabetes, pre-diabetes, or non-diabetic populations) - Children or adolescents (< 18 years)
Intervention	Psychological interventions, including, but not limited to CBT, GSD, BGAT, MET, psychotherapy, relaxation training	- Studies not evaluating psychological treatments, or the study does not report treatment comparisons, such as: - Educational interventions as a standalone intervention - Non-psychological interventions - Drug treatments
Comparators	Any comparator of interest: placebo, SOC, any interventions listed as the intervention of interest, drug treatments	None
Outcomes	<u>Clinical</u> - Change from baseline in (mmol/mol) at 12 months $\pm$ reasonable range - Time in range - Episodes of diabetic ketoacidosis - Episodes of hypoglycaemia - Episodes of microvascular complication <u>PROs</u> - Patient activation measures - Diabetes Distress Score - EQ-5D (and other generic quality of life questionnaires) - PAID - WHO-5 - PHQ-9 - Other psychological well-being outcomes - Adherence - Coping behaviours - Glucose monitoring - Behavioral profiling questionnaire tool (including but not limited to the following) <u>HCRU</u> - Hospitalizations - Length of stay - Emergency department visits - Specialist visits - Physician visits	- Relevant outcomes are not reported, or data are not extractable - Studies evaluating a mixed population ($< 80\%$ adults with T1DM), but results are not reported separately for population of interest

PICOS	Inclusion Criteria	Exclusion Criteria
Study design	• RCTs ◦ Phase II, III, and IV • Subgroup and post hoc analysis of eligible RCTs Pooled analyses of eligible RCTs	• Full-text articles not published in English • Conference abstract published prior to 2019 • Editorial, erratum, trial protocol, guideline, case report, narrative review, etc. • In vitro, ex vivo, animal, or pharmacokinetic studies, phase I trials, etc. • Observational studies, including prospective and retrospective cohort studies and cross-sectional analyses • SLRs/NMAs in adult patients with T1DM treated with psychological setting to be used for manual reference checks

Abbreviations: CBT = cognitive behavioural therapy; GSD = guided self-determination; HbA1c = haemoglobin A1c; HCRU = healthcare resource utilisation; MET = motivational enhancement therapy; NMA = network meta-analysis; PAID = Problem Areas In Diabetes; PHQ-9 = Patient Health Questionnaire-9; RCT = randomised controlled trial; SLR = systematic literature review; SOC = standard of care; T1DM = type 1 diabetes mellitus; T2DM = type 2 diabetes mellitus; WHO-5 = WHO-5 Well-Being Index

Table S3. Patient Baseline Characteristics

First Author, Year	Treatment	Mean Age (SD) (years)	Males (%)	Mean (SD) HbA1c (%)	Mean (SD) Diabetes Duration (years)	Mean BMI (SD) (kg/m ²)	Insulin Therapy (%)	Complications (%)
Amsberg, 2009 [1]	CBT	41.1 (11.7)	44.4%	8.5 (0.9)	19.9 (9.4)	24.8 (3.3)	CSII:13.9% MDI: 86.1%	Retinopathy: 55.6% Nephropathy: 2.8% Neuropathy: 11.1%
	Usual care	41.4 (12.9)	57.9%	8.5 (0.8)	23.2 (11.8)	24.8 (2.7)	CSII:15.8% MDI: 84.2%	Retinopathy: 57.9% Nephropathy: 10.5% Neuropathy: 18.4%
Bisno, 2021 [2]	Telehealth	20.43 (1.94)	29%	—	8.93 (5.22)	—	—	—
	Telehealth+VGA	20.52 (2.06)	39%	—	11 (4.84)	—	—	—
Didjurgeit, 2002 [3]	Psychotherapy	36 (9)	39.1%	9 (2)	23 (9)	25 (5)	—	Neuropathy: 100% Retinopathy: 96% Nephropathy: 47.8%
	Waiting list	41 (10)	38.1%	8.7 (1.7)	25 (10)	25 (5)	—	Neuropathy: 100% Retinopathy: 57.1% Nephropathy: 42.9%
Fisher, 2018 (T1-REDEEM) [4]	Emotion-focused (Know IT)	47.3 (14.5)	—	8.77 (1.13)	26.12 (13.97)	—	—	—
	Education (OnTrack)	42.8 (15.1)	—	8.83 (1.11)	23.17 (13.26)	—	—	—
Ismail, 2008 (ADAPT) [5]	MET+CBT	36.6 (—)	37.7%	Median (IQR): 9.25 (8.6, 10.3)	Median (IQR): 18.6 (12.0, 24.6)	Median (IQR): 25.3 (22.9, 28.0)	—	Neuropathy: 25.7% Retinopathy: 70.2%
	MET	35.7 (—)	35%	Median (IQR): 9.4 (8.8, 9.9)	Median (IQR): 16.4 (10.2, 23.0)	Median (IQR): 25.8 (22.9, 28.6)	—	Neuropathy: 22.3% Retinopathy: 67.3%
	Usual care	36 (—)	45.4%	Median (IQR): 9.4 (8.8, 10.2)	Median (IQR): 18.7 (10.6, 26.8)	Median (IQR): 25.4 (22.9, 28.6)	—	Neuropathy: 17.8% Retinopathy: 71.3%
Menting, 2017 [6]	CBT	44.4 (12.1)	38%	8.1 (1)	24.2 (13.3)	26.2 (4.8)	MDI: 37% CSII: 63% CGM: 12%	Retinopathy: 22% Nephropathy: 5% Neuropathy: 20%

First Author, Year	Treatment	Mean Age (SD) (years)	Males (%)	Mean (SD) HbA1c (%)	Mean (SD) Diabetes Duration (years)	Mean BMI (SD) (kg/m ²)	Insulin Therapy (%)	Complications (%)
	Waiting list	42.9 (12.5)	38%	8 (1)	24.1 (13.9)	26 (4)	MDI: 25% CSII: 75% CGM: 20%	Retinopathy: 23% Nephropathy: 5% Neuropathy: 18%
Mohn, 2017 [7]	GSD	36.9 (9.4)	27.1%	9.1 (1)	18.5 (10.6)	25 (3.6)	CSII: 33.3%	Any: 22.9%
	Usual care	37.2 (10.9)	44.6%	9.3 (1.2)	20.6 (11.2)	26 (4.1)	CSII: 44.6%	Any: 34.9%
Morillas, 2020 [8]	App (SocialDiabetes) and usual care (pooled)	39.11 (—)	—	8.5 (1.2)	—	—	—	—
Paschali, 2020 [9]	Relaxation training	—	—	10.4 (1.8)	—	—	—	—
	Blood circulation training	—	—	9.3 (1.5)	—	—	—	—
Petrak, 2015 (DAD)[10]	CBT	49 (10.6)	37.3%	9.3 (1.49)	15.7 (10.4)	—	—	Any: 57.1%
	Sertraline	47.9 (12.8)	38.4%	9.2 (1.44)	15 (10.6)	—	—	Any: 57.6%
Rondags, 2016 [11]	BGAT (HypoAware)	52.7 (12.4)	52%	7.7 (1)	24.6 (14)	26 (5.3)	CSII: 41% MDI: 59%	Any: 41%
	Usual care	51.3 (4)	56%	7.7 (1.1)	27.5 (13.1)	25.2 (3.9)	CSII: 55% MDI: 46%	Any: 42%
van der Ven, 2005 [12]	CBGT and BGAT (pooled)	—	—	—	—	—	—	Retinopathy: 33% Nephropathy: 13% Neuropathy: 14.8%
Zoffmann, 2006 [13]	GSD	36.8 (1.7)	46.5%	9.01 (0.2)	—	—	—	—
	Waiting list	35.7 (2.1)	50%	9.05 (0.2)	—	—	—	—
Zoffmann, 2015 [14]	Flexible GSD	25.9 (5)	50%	9.5 (1.3)	13.8 (6.9)	24.5 (3.8)	CSII: 14.9%	Any: 26.9% Retinopathy: 20.1% Nephropathy: 0.7% Neuropathy: 0%
	Waiting list	25.3 (5.2)	50%	9.7 (1.5)	13.7 (6.8)	24.8 (3.6)	CSII: 18.2%	Any: 37.9% Retinopathy: 22.7%

First Author, Year	Treatment	Mean Age (SD) (years)	Males (%)	Mean (SD) HbA1c (%)	Mean (SD) Diabetes Duration (years)	Mean BMI (SD) (kg/m ²)	Insulin Therapy (%)	Complications (%)
								Nephropathy: 3% Neuropathy: 1.5%

Abbreviations: BGAT = blood glucose awareness training; BMI = body mass in; CBGT = cognitive behavioural group training; CBT = cognitive behavioural therapy; CGM = continuous glucose monitoring; CSII = continuous subcutaneous insulin infusion; GSD = guided self-determination; HbA1c = haemoglobin A1c; IQR = interquartile range; MDI = multiple daily injection; MET = motivational enhancement therapy; VGA = virtual group appointment

Table S4. Risk-of-Bias Assessment

First Author, Year	Randomisation Process	Deviations from Intended Interventions	Missing Outcome Data	Measurement of the Outcome	Selection of the Reported Result	Overall Bias
Amsberg, 2009 [1]	Low risk	Low risk	Low risk	High risk	Low risk	High risk
Bisno, 2021 [2]	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
Didjurgeit, 2002 [3]	Some concerns	Low risk	Low risk	High risk	Low risk	High risk
Fisher, 2018 (T1-REDEEM) [4]	Low risk	Some concerns	Low risk	Low risk	Low risk	Some concerns
Ismail, 2008 (ADAPT) [5]	Low risk	Some concerns	Low risk	High risk	Low risk	High risk
Menting, 2017 [6]	Low risk	Low risk	Low risk	High risk	Low risk	High risk
Mohn, 2017 [7]	Low risk	High risk	Some concerns	High risk	Low risk	High risk
Paschali, 2020 [9]	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
Petrak, 2015 (DAD) [10]	Low risk	Some concerns	Low risk	High risk	Low risk	High risk
Rondags, 2016 [11]	Low risk	Low risk	Low risk	High risk	Low risk	High risk
van der Ven, 2005 [12]	Some concerns	Low risk	Low risk	High risk	Low risk	High risk
Zoffmann, 2006 [13]	Low risk	Low risk	Low risk	High risk	Low risk	High risk
Zoffmann, 2015 [14]	Some concerns	Low risk	Low risk	High risk	Low risk	High risk
Morillas, 2020 [8]	Not assessed (conference abstract)					

Table S5. Results Overview: HbA1c

First Author, Year	Study Arm	N	Timepoint (months)	Mean (SD)		Mean CFB (SD), <i>P</i> value	Mean Difference at Follow-up (95% CI), <i>P</i> Value	Mean Difference in CFB (95% CI), <i>P</i> value
				Baseline	Follow-up			
Paschali, 2020 [9]	Relaxation training	24	2	10.4 (1.8)	9.1 (1.61)	-1.3 (-2.63, 0.03), <0.01	Ref	-2.40 (-3.44, -1.36) <i>P</i> <0.05
	Blood circulation training	22		9.3 (1.5)	10.4 (2.1)	+1.1 (-0.29, 2.49)	1.3 (-0.06, 2.66), NS	Ref
van der Ven, 2005 [12]	CBGT	45/32	3	8.8 (1.3)	8.7 (1.24)	—	—	-0.20 (-0.77, 0.37), NS
	BGAT	41/36		9.1 (1.1)	9.2 (1.1)	—	Ref	Ref
Menting, 2017 [6]	CBT	60	5	8.1 (1.0)	8.0 ^a	—	—	0.00 (-0.36, 0.36), NS
	Waiting list	60		8.0 (1.0)	7.90 ^a	—	Ref	Ref
Didjurgeit, 2002 [3]	Psychotherapy	23	6	9.1 (2)	8.5 (1.6)	-0.6	<i>P</i> =0.016	-0.70 (-1.78, 0.38,) NS
	Waiting List	21		8.7 (1.7)	8.8 (1.9)	+0.1	Ref	Ref
Morillas, 2020 [8]	App (SocialDiabetes)	63	6	8.43 (1.25)	8.22 (0.99)	—	—	0.21 (-0.19, 0.61), NS
	Usual care	67		8.66 (1.17)	8.24 (1.24)	—	Ref	Ref
Rondags, 2016 [11]	BGAT (HypoAware)	71	6	—	—	-0.24 ^a	-0.23 ^a	-0.23 (-0.62, 0.16), NS
	Usual care	66		—	—	-0.01 ^a	Ref	Ref
Fisher, 2018 (T1-REDEEM) [4]	Emotion-focused (Know IT)	149	9	8.77 (1.13)	8.59 (1.25)	—	—	0.00 (-0.27, 0.27), NS
	Education (OnTrack)	152		8.83 (1.11)	8.65 (1.19)	—	Ref	Ref
Mohn, 2017 [7]	GSD	48	9	9.1 (1)	8.5 (1.1)	<i>P</i> <0.001	—	-0.20 (-0.60, 0.20), NS

First Author, Year	Study Arm	N	Timepoint (months)	Mean (SD)		Mean CFB (SD), <i>P</i> value	Mean Difference at Follow-up (95% CI), <i>P</i> Value	Mean Difference in CFB (95% CI), <i>P</i> value
				Baseline	Follow-up			
	Usual care	83		9.3 (1.2)	8.9 (1.3)	<i>P</i> <0.001	Ref	Ref
Ismail, 2008 (ADAPT) [5]	MET	117/105	12	9.57 (1.03)	9.3 (1.61)	-0.24 (-0.04, 0.52), <i>P</i> =0.10	—	-0.16 (-0.51, 0.12) <i>P</i> =0.38
	MET + CBT	106/95		9.61 (1.26)	9.11 (1.38)	-0.59 (-0.31, -0.87) <i>P</i> =0.0001	—	-0.45 (-0.79, -0.12) <i>P</i> =0.008
	Usual care	121/105		9.7 (1.18)	9.54 (1.52)	-0.12 (-0.10, 0.35), <i>P</i> =0.28	Ref	Ref
Amsberg, 2009 [1]	CBT	36	12	8.5 (0.9)	7.72	—	—	-0.49 (-0.87, -0.11) <i>P</i> =0.012
	Usual care	38		8.5 (0.8)	8.21	—	Ref	Ref
Bisno, 2021 [2]	Telehealth + VGA	22/14	12	8.62 (1.37)	9.51 (1.18)	+0.88	—	+0.34 (-0.58, 1.26), NS
	Telehealth	18/14		8.61 (1.34)	9.15 (0.93)	+0.54	Ref	Ref
Zoffmann, 2006 [13]	GSD	30	12	9.01 (0.2 ^a)	—	—	-0.41 <i>P</i> <0.0099	-0.30 (-0.72, 0.12), NS
	Waiting list	20		9.05 (0.2 ^a)	—	—	Ref	Ref
Petrak, 2015 (DAD) [10]	CBT	65	15	—	—	+0.18	—	-0.13 (-0.54, 0.28), NS
	Sertraline	64		—	—	+0.31	Ref	Ref
Zoffmann, 2015 [14]	Flexible GSD	134	18	9.5 (1.3)	—	-0.4	<i>P</i> =0.073	-0.30 (-0.72, 0.12), NS
	Waiting list	66		9.7 (1.5)	—	-0.1	Ref	Ref

Studies reporting on HbA1C concentration in mmol/mol (IFCC) units were synthesized with the studies presenting HbA1C levels in % (DCCT/NGSP). HbA1c reported in mmol/mol were converted to % based on the standard conversion formula. The mean differences in changes from baseline reported in the

publications were prioritized, and where data were missing, we calculated the estimates for the treatment differences in change from baseline based on the pre-post arm-level data published in the included studies.

Abbreviations: BGAT = blood glucose awareness training; CBT = cognitive behavioral therapy; CBGT = cognitive behavioural group training; CFB = change from baseline; CI = confidence interval; GSD = guided self-determination; MET = motivational enhancement therapy; N = number of participants analyzed; NS = not significant; SD = standard deviation; VGA = virtual group appointment

^a Standard error

Table S6. Results Overview: Key PROs, Quality of Life

Trial Name	Study Arm	N	Timepoint (months)	Mean (SD)		Mean CFB (SD), <i>P</i> value	Mean Difference at Follow-up (95% CI), <i>P</i> value	Mean Difference in CFB (95% CI), <i>P</i> value
				Baseline	Follow-up			
EQ-5D-based Utility								
Bisno, 2021 [2]	Telehealth + VGA	18/16	12	0.75 (1.44)	0.81 (0.6)	+0.07	—	+0.05 (NR) <i>P</i> =0.88
	Telehealth	27/18		0.76 (1.19)	0.76 (0.6)	+0.01	Ref	Ref
W-BQ12								
Amsberg, 2009 [1]	CBT	36	12	21.5 (7.4)	24.57	—	2.39 (0.3, 4.49) <i>P</i> =0.026	—
	Usual care	38		22 (7.5)	22.18	—	Ref	Ref
IRES								
Didjurgeit, 2002 [3]	Psychotherapy	23	6	4 (2.2)	4.4 (1.7)	—	<i>P</i> =0.21	—
	Waiting list	21		4.7 (2.0)	4.3 (1.6)	—	Ref	Ref
DQOL								
Ismail, 2008 (ADaPT) [5]	MET	117	12	—	—	—	0.12 (-0.03, 0.26), NS	—
	MET + CBT	106		—	—	—	0.04 (-0.1, 0.18), NS	—
	Usual Care	121		—	—	—	Ref	Ref

Abbreviations: ADaPT = A Diabetes and Psychological Therapies; CBT = cognitive behavioral therapy; CFB = change from baseline; CI = confidence interval; DQOL = Diabetes Quality of Life; IRES = Indicators of the Rehabilitation Status; MET = motivational enhancement therapy; N = number of participant analyzed; NR = not reported; NS = not significant; PRO = patient-reported outcome; SD = standard deviation; VGA = virtual group appointment; W-BQ12 = Wellbeing Questionnaire: evidence for a three-factor structure with 12 items

Table S7. Results Overview: Key PROs, Mental Health

Trial Name	Study Arm	N	Timepoint (months)	Mean (SD)		Mean CFB (SD), <i>P</i> value	Mean Difference at Follow-up (95% CI), <i>P</i> value	Mean Difference in CFB (95% CI) ^a , <i>P</i> value
				Baseline	Follow-up			
HAMD-17								
Petrak, 2015 (DAD) [10]	CBT	65	15	—	—	-9.05	<i>P</i> <0.01	—
	Sertraline	64		—	—	-14.12	Ref	Ref
HADS								
Rondags, 2016 [11]	BGAT (HypoAware)	—	6	—	—	—	Relative Risk Crude: 0.83, <i>P</i> =0.07 Demographic-adjusted: 0.79, <i>P</i> =0.024 Diabetes-adjusted:0.83, <i>P</i> =0.077	
	Usual care	—		—	—	—	Ref	Ref
PHQ-9								
Ismail, 2008 (ADaPT) [5]	MET	117	12	Median (IQR): 6 (3,10)	—	—	—	+0.02 (-1.18, 1.21) <i>P</i> =0.98
	MET + CBT	106		Median (IQR): 6 (3,10)	—	—	—	+1.1 (-0.34, 2.54) <i>P</i> =0.14
	Usual care	121		Median (IQR): 6 (3,12)	—	—	Ref	Ref
PSS								
Amsberg, 2009 [1]	CBT	36	12	24.3 (10.3)	20.01	—	-3.73 (-6.73, -0.72) <i>P</i> =0.016	—
	Usual Care	38		23.7 (8.8)	23.74	—	Ref	Ref
SCL-90-R								
Didjurgeit, 2002 [3]	Psychotherapy	24	6	1.1 (0.71)	0.93 (0.81)	—	<i>P</i> =0.49	—
	Waiting list	22		0.99 (0.47)	0.75 (0.49)	—	Ref	Ref

Trial Name	Study Arm	N	Timepoint (months)	Mean (SD)		Mean CFB (SD), <i>P</i> value	Mean Difference at Follow-up (95% CI), <i>P</i> value	Mean Difference in CFB (95% CI ^a), <i>P</i> value
				Baseline	Follow-up			
Depression remission								
Petrak, 2015 (DAD) [10]	CBT	65	15	—	29 (44.4) ^b	—	<0.05	—
	Sertraline	64		—	47.6 (74.3) ^b	—	Ref	Ref
CES-D								
van der Ven, 2005 [12]	CBGT	52/45	12	15.7 (NR)	15.4 (NR)	—	—	—
	BGAT	55/41		16.9 (NR)	15.5 (NR)	—	—	—
Bisno, 2021 [2]	Teleheath + VGA	18/16	12	16.97 (7.88)	16.81 (7.3)	−0.15 (NR)	−0.08 (NR) <i>P</i> =0.71	—
	Telehealth	26/16		17.08 (12.52)	17.86 (12.39)	+0.78 (NR)	Ref	Ref
WHO-5								
Mohn, 2017 [7]	GSD	90/48	9	60.9 (19.8)	60.6 (17.4)	<i>P</i> =0.960	—	+4.97 (-0.80 , 10.75), <i>P</i> =0.091
	Usual Care	83/83		57.6 (18.6)	56.3 (21.4)	<i>P</i> =0.129	Ref	Ref
Zoffmann, 2015 [14]	Flexible GSD	134/92	18	55.7 (19.8)	—	+3.8 (14.9)	—	—
	Waiting List	66/59		54.4 (18.7)	—	+0.8 (13.9)	—	—

Abbreviations: ADaPT = A Diabetes and Psychological Therapies; BGAT = blood glucose awareness training; CBT = cognitive behavioral therapy; CES-D = Center for Epidemiologic Studies Depression Scale; CFB = change from baseline; CI = confidence interval; GSD = guided self-determination; HADS = Hospital Anxiety and Depression Scale; HAMD-17 = 17-item Hamilton Depression Rating Scale; IQR = interquartile range; MET = motivational enhancement therapy; N = number of participant analyzed; PHQ-9 = Patient Health Questionnaire-9; PSS = Perceived Stress Scale; SCL-90-R = Symptom Checklist-90-Revised; SD = standard deviation; VGA = virtual group appointment

^a Number and percentage of patients with event

^b Standard error.

Table S8. Results Overview: Key PROs, Diabetes Distress

Trial name	Study Arm	N*	Timepoint (months)	Mean (SD)		Mean CFB (SD), P value	Mean Difference at Follow-up (95% CI), P value	Mean Difference in CFB (95% CI), P value
				Baseline	Follow-up			
DDS								
Mohn, 2017 [7]	GSD	48	9	33.1 (16.4)	27.9 (16.8)	P=0.012	Ref	Ref
	Usual care	83		31.9 (16.7)	30.4 (17.5)	P=0.323	—	-5.15 (-9.34, -0.96) P=0.016
Fisher, 2018 (T1-REDEEM) [4]	Emotion-focused (Know IT)	149	9	2.87 (0.63)	2.18 (0.65)	—	—	—
	Education (OnTrack)	152		2.9 (0.6)	2.15 (0.52)	—	—	—
Bisno, 2021 [2]	Teleheath + VGA	18/16	12	1.95 (0.85)	1.79 (0.71)	-0.16 (NR)	—	-0.40 (NR) P=0.02
	Telehealth	26/16		1.94 (0.88)	2.14 (0.8)	+0.19 (NR)	Ref	Ref
PAID-20								
Mohn, 2017 [7]	GSD	48	9	36.8 (19.3)	29.8 (18.9)	P=0.002	—	-6.96 (-11.40 , -2.52) P=0.002
	Usual care	83		35.3 (18.7)	34.2 (19.6)	P=0.488	Ref	Ref
Amsberg, 2009 [1]	CBT	36	12	31.1 (20.4)	22.92	—	-6.88 (-11.5, -2.25), P=0.004	-4.58 (-13.22, 4.06), NS
	Usual care	38		33.4 (17.3)	29.8	—	Ref	Ref
van der Ven, 2005 [12]	CBT	45/33	12	43.4 (22.4)	38.3	—	—	-1.50 (-10.90, 7.90), NS
	BGAT	41/38		49 (17.2)	45.4	—	Ref	Ref
Zoffmann, 2006 [13]	GSD	36	12	32 (3.4)	25.6 (2.7)	—	-11.1 (-21;-1.1) P<0.05	-2.20 (-12.56, 8.16), NS
	Waiting list	25		40.9 (4)	36.7 (4.5)	—	Ref	Ref

Trial name	Study Arm	N*	Timepoint (months)	Mean (SD)		Mean CFB (SD), <i>P</i> value	Mean Difference at Follow-up (95% CI), <i>P</i> value	Mean Difference in CFB (95% CI), <i>P</i> value
				Baseline	Follow-up			
Zoffmann, 2015 [14]	Flexible GSD	92	18	36.4 (21)	—	-9.1 (15,2)	—	-8.7 (-13.1, -4.2) <i>P</i> <0.001
	Waiting list	59		35.2 (22.7)	—	-0.3 (14.7)	Ref	Ref
PAID-5								
Rondags, 2016 [11]	BGAT (HypoAware)	71	6	—	—	—	—	Relative Risk: Crude: 0.90, <i>P</i> =0.307 Demographic-adjusted: 0.87, <i>P</i> =0.204 Diabetes-adjusted: 0.91, <i>P</i> =0.365
	Usual care	66		—	—	—	—	Ref
HFS								
Amsberg, 2009 [1]	CBT	36	12	11.6 (8.9)	11.84	—	-0.28 (-2.39, 1.82), <i>P</i> =0.79	—
	Usual care	38		14.2 (10.1)	12.12	—	Ref	Ref

Abbreviations: ADaPT = A Diabetes and Psychological Therapies; BGAT = blood glucose awareness training; CBT = cognitive behavioral therapy; CFB = change from baseline; CI = confidence interval; DDS = Diabetes Distress Scale; GSD = guided self-determination; HFS = Hypoglycemia Fear Survey; N = number of participant analyzed; NR = not reported; PAID = Problem Areas In Diabetes; PROs = patient-reported outcomes; PSS = Perceived Stress Scale; SCL-90-R = Symptom Checklist-90-Revised; SD = standard deviation; VGA = virtual group appointment

Table S9. Results Overview: Other Outcomes, PROs

First Author, Year	Study Arm	N	Timepoint (months)	Mean (SD)		Mean CFB (SD), <i>P</i> value	Mean Difference at Follow-up (95% CI), <i>P</i> value	Mean Difference in CFB 95% CI), <i>P</i> value
				Baseline	Follow-up			
Self efficacy: SED								
Bisno, 2021 [2]	Telehealth + VGA	18/16	12	141.58 (13.62)	136.19 (13.76)	−5.39	—	-0.10 (NR) <i>P</i> =0.74
	Telehealth	26/16		142.34 (24.85)	139.33 (23.62)	−3.01	Ref	Ref
Self efficacy: PCDS-5								
Mohn, 2017 [7]	GSD	90/48	9	4.4 (1.4)	4.7 (1.6)	<i>P</i> =0.071	—	+0.26 (-0.17, 0.70) <i>P</i> =0.229
	Usual care	83/83		4.5 (1.6)	4.7 (1.5)	<i>P</i> =0.305	—	Ref
Zoffmann, 2015 [14]	GSD	134/92	18	4.9 (1.2)	—	+0.7 (1.1)	—	—
	Waiting list	66/59		5.1 (1.4)	—	+0.0 (1.4)	—	—
Self efficacy: PCDS-3								
Zoffmann, 2006 [13]	GSD	36/30	12	17.5 [14.8, 19.0]	18 [16.75, 20.00]	—	—	—
	Waiting list	25/20		15.0 [11.25, 18.00]	16.5 [15.00, 18.75]	—	—	—
Self-efficacy: CIDS								
Menting, 2017 [6]	CBT	60/55	5	—	—	+4.1 (1.4, 6.7) <i>P</i> =0.006	—	—
	Waiting list	60/57		—	—	-0.5 (-2.4, 1.5), NS	—	—
van der Ven, 2005 [12]	CBGT	52/45	12	73.3	78.3	—	—	—
	BGAT	55/41		73.0	75.8	—	—	—
Patient Autonomu Support: HCCQ								
Mohn, 2017 [7]	GSD	48	9	4.9 (1.6)	5 (1.6)	<i>P</i> =0.802	—	+0.03 (−0.48, 0.54) <i>P</i> =0.904
	Usual care	83		5.1 (1.4)	5 (1.4)	<i>P</i> =0.618	Ref	Ref

First Author, Year	Study Arm	N	Timepoint (months)	Mean (SD)		Mean CFB (SD), <i>P</i> value	Mean Difference at Follow-up (95% CI), <i>P</i> value	Mean Difference in CFB 95% CI), <i>P</i> value
				Baseline	Follow-up			
Zoffmann, 2006 [13]	GSD	36	12	26.9 (1.2)	28.9 (1)	—	5.5 (1.9, 9.1) <i>P</i> <0.05	—
	Waiting list	25		23.5 (1.5)	23.5 (1.6)	—	Ref	Ref
Zoffmann, 2015 [14]	Flexible GSD	92	18	5.6 (1.1)	—	+0.5 (1.1)	—	+0.5 (0.2, 0.9) <i>P</i> <0.01
	Waiting list	59		5.8 (1.2)	—	-0.1 (1.6)	Ref	Ref
Self-esteem: RSES								
Mohn, 2017 [7]	GSD	48	9	19.5 (5.4)	20.2 (4.8)	<i>P</i> =0.267	Ref	Ref
	Usual care	83		19.6 (5.5)	18.9 (5.5)	<i>P</i> =0.027	—	+1.43 (0.34, 2.52), <i>P</i> =0.011
Zoffmann, 2015 [14]	Flexible GSD	134	18	20.4 (4.5)	—	+1.1 (3.9)	—	—
	Waiting list	66		21.9 (5.8)	—	-0.7 (3.7)	—	—
Adaptive behaviours: DSTAR-teen								
Bisno, 2021 [2]	Telehealth + VGA	18/16	12	48.68 (4.54)	47.13 (3.71)	-1.56	—	+0.07 (NR) <i>P</i> =0.75
	Telehealth	26/16		48.45 (9.76)	46.33 (7.23)	-2.11	Ref	Ref

Abbreviations: BGAT = blood glucose awareness training; CBGT = cognitive behavioural group training; CBT = cognitive behavioural therapy; CFB = change from baseline; CI = confidence interval; CIDS = Confidence in Diabetes Self-Care; DSTAR-teen = Diabetes Strengths and Resilience Measure for Adolescents; GSD = guided self-determination; HCCQ = Health Care Climate Questionnaire; N = number of participant analyzed; NR = not reported; PCDS = Perceived Competence in Diabetes Scale; PROs = patient-reported outcomes; RSES = Rosenberg Self-Esteem Scale; SD = standard deviation; SED = Self-Efficacy for Diabetes Scale; VGA = virtual group appointment

Table S10. Results Overview: Other Outcomes, Glucose Monitoring and Healthcare Resource Use

Trial name	Outcome	Study Arm	N	Timepoint (months)	N (%)	Change from Baseline, P value	Odds Ratio (95% CI), P value	
					Baseline	Follow-up		
SMBG								
Mohn, 2017 [7]	SMBG <1/day	GSD	48	9	11 (22.9)	5 (10.6)	—	3.12 (0.57, 16.97) P=0.189
		Usual Care	83		24 (28.9)	18 (22.0)	—	Ref
	SMBG 1–6 times per day	GSD	48	9	29 (60.4)	8 (17.0)	—	1
		Usual Care	83		51 (61.4)	10 (12.2)	—	Ref
	SMBG ≥7 times per day	GSD	48	9	8 (16.7)	34 (72.3)	P<0.001	0.92 (0.31, 2.74) P=0.887
		Usual Care	83		8 (9.6)	54 (65.9)	P<0.001	Ref
van der Ven, 2005 [12]	SMBG <1/day	CBGT	45/32	12	7 (16.3)	4 (12.1)	—	—
		BGAT	41/36		12 (29.3)	6 (17.1)	—	—
Zoffmann, 2006 [13]	SMBG, frequency	GSD	36	12	8 (1.5, 20) ^a	20 (5,27) ^a	—	—
		Waiting List	25		8.5 (2,20) ^a	10 (2,24) ^a	—	—
Gold score								
Rondags, 2016 [11]	--	BGAT (HypoAware)	—	—	—	—	—	Crude: 0.33, P=0.011 Demographic-adjusted: 0.24, P=0.004 Diabetes-adjusted:0.38, P=0.038 Relative Risk Crude: 0.91, P=0.044 Demographic-adjusted: 0.89, P=0.008

Trial name	Outcome	Study Arm	N	Timepoint (months)	N (%)	Change from Baseline, P value	Odds Ratio (95% CI), P value	
					Baseline	Follow-up		
								Diabetes-adjusted:0.92, P=0.113
	--	Usual Care	—	—	—	—	—	Ref
HCRU								
Ismail, 2008 (ADaPT)[5]	Hospitalisations	MET	117/96	6-12	8 (6.8)	9 (9.4)	—	—
		MET + CBT	106/88		4 (3.8)	7 (8.0)	—	—
		Usual Care	121/102		7 (5.8)	9 (8.8)	—	—
Ismail, 2008 (ADaPT)[5]	Diabetes foot clinic visits	MET	117/84	6	11.1	7.1	—	—
		MET + CBT	106/82		8.5	11.0	—	—
		Usual care	121/77		10.7	6.5	—	—
	Phlebotomy	MET	117/84	6	10.3	2.4	—	—
		MET + CBT	106/82		8.5	9.8	—	—
		Usual care	121/77		10.7	3.9	—	—
	Diabetes clinic visits	MET	117/96	12	88.0	75.0	—	—
		MET + CBT	106/88		84.9	72.7	—	—
		Usual care	121/102		87.6	70.6	—	—
	Diabetes eye clinic visits	MET	117/96	12	32.5	24.0	—	—
		MET + CBT	106/88		37.7	23.9	—	—
		Usual care	121/102		40.5	25.5	—	—
	Ophthalmology	MET	117/96	12	7.7	13.5	—	—
		MET + CBT	106/88		5.7	10.2	—	—
		Usual care	121/102		5.0	13.7	—	—

Abbreviations: ADaPT = A Diabetes and Psychological Therapies; BGAT = blood glucose awareness training; CBGT = cognitive behavioural group training; CBT = cognitive behavioural therapy; CI = confidence interval; GSD = guided self-determination; HCRU = healthcare resource utilisation; MET = motivational enhancement therapy; N = number of participant analyzed; SMBG = self-monitoring of blood glucose; VGA = virtual group appointment

^a Median (interquartile range)

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