

Table 1: Description of predefined core elements of case management interventions derived from previous studies [9, 10]

Component	Description
Development and review of individualized care plans	Guidance of care through an individual care plan that is tailored to patient's individual needs, preferences and goals. The plan is reviewed and updated on a regular basis.
Proactive monitoring of Symptom and/or risk factor	Regular monitoring of risk factors, symptoms and adverse events of therapy implying a proactive follow-up to prevent complications.
Medication review and monitoring of therapy adherence	Collecting and documenting all prescribed and self-administered medications a patient uses, including information on patient experience, adverse events, intake experience, and therapy adherence and compliance; accordingly tailoring the medication to individual's medication needs.
Multidisciplinary case meetings	Discussing disease management and treatment options of individual patients within scheduled meetings with different other health care providers.
Use of evidence-based guidelines	Implementation of evidence-based guidelines valid in daily practice.
Delivery of information support for involved health care providers	Educating and training health care professionals on disease management and treatment, including up-to-date knowledge on evidence-based guidelines.
Education on disease management	Providing educational materials or trainings to patients on disease management and treatment and/or trainings on enhancing self-management skills.
Assessment and providing support on social and financial support	Finding out if the patient and/or the carer is aware of different services for social and financial support; and referral to local community services.
Provision of a single point of access	Patients have a central and single point of contact for questions and problems.

TABLE 2: Main study characteristics

Outcome	Study (Author, year)	Country	Study design	Chronic disease of participants	N (% women)	Mean age in years (SD)	Outcome measures		Summary of results	Follow-up in months	Quality score**
							Feelings of anxiety	Depressive symptoms			
Anxiety Depression	Stoop et al. 2015 [46]	The Netherlands	RCT	Heart Failure and/or COPD and/or asthma	I: 23 (57) C: 23 (47)	I: 66.2 (11.7) C: 54.8 (13.9)	GAD-7	PHQ-9	The intervention group reported lower symptoms of depression, but no significant differences was found; the intervention group reported less anxiety scores with a significant difference	18	4/7
Anxiety Depression	Egan et al. 2002 [25]	Australia	RCT	COPD	I: 33 (64) C: 33 (40)	I: 67.2 (x) C: 67.8 (x)	HADS	HADS	The intervention group experienced an improvement in the level of anxiety, but no significant difference was detected between groups; the intervention had no significant impact on depression	1; 3	4/7
Anxiety Depression	Hernandez et al. 2015 [40]	Spain	RCT	COPD	I: 71 (17) C: 84 (14)	I: 73 (-) C: 75 (-)	HADS	HADS	The intervention group showed less depression scores with a significant difference; and less anxiety symptoms with no significant difference	12	5/7
Anxiety Depression	Mertz et al. 2017 [42]	Denmark	RCT	Breast cancer	I: 25 (100) C: 25 (100)	I: 50.9 (12.1) C: 55.0 (9.8)	HADS	HADS	The intervention group experienced an improvement in depressive and anxiety scores with a significant difference	6; 12	5/7
Anxiety Depression	Rose et al. 2017 [45]	NR	RCT	COPD	I: 236 (50) C: 234 (56)	I: 71 (9.2) C: 71 (9.7)	HADS	HADS	No significant group differences were found in depression scores	3; 6; 12	4/7
Anxiety Depression	Titova et al. 2015 [47]	Norway	RCT	COPD	I: 91 (57) C: 80 (58)	I: 73.6 (9.2) C: 72.2 (9.4)	HADS	HADS	Intervention group experienced decrease in anxiety and depression scores with a significant difference	24	2/7
Anxiety Depression	Tsuchihashi -Makaya et al. 2013 [28]	Japan	RCT	Heart Failure	I: 79 (47) C: 82 (40)	I: 76.9 (10.9) C: 75.8 (12.1)	HADS	HADS	Intervention group experienced decrease in anxiety and depression scores with a significant difference	2; 6; 12	2/7
Anxiety	Avci et al. 2019 [50]	Turkey	Non-randomized	Colorectal cancer	I: 60 (26) C: 60 (32)	I: 59.0 (11.5) C: 61.6 (12.3)	STAI	-	The intervention group experienced less frequently anxiety than the control group with a significant difference.	**	3/9
Depression	Gabbay et al. 2013 [38]	USA	RCT	Diabetes*	I: 232 (62) C: 313 (55)	I: 58 (11.41) C: 58 (11.34)	-	CES-D	The intervention led to improved depression scores	24	3/7
Depression	Miklavcic et al. [2020]	Canada	RCT	Diabetes*	I: 70 (62.9) C: 28 (45.2)	I: - C: -	-	CESD-10	No significant group differences were found in depression scores	6	6/7

Depression	Steel et al. 2016 [30]	USA	RCT	Cancer	I: 144 (-) C: 117 (-)	I + C: 61 (-)	-	CES-D	Depression scores decreased in the intervention group	6	5/7
Depression	Callahan et al. 2006 [35]	USA	RCT	Alzheimer's Disease	I: 39 (46) C: 27 (39)	I: 77.4 (5.9) C: 77.7 (5.7)	-	Cornell scale	The intervention had no significant impact on depression scores	6; 12; 18	6/7
Depression	Kroenke et al. 2010 [41]	USA	RCT	Cancer	I: 202 (63) C: 203 (72)	I: 58.7 (11.0) C: 59.0 (10.6)	-	HSCL-20	The intervention group experienced an improvement in depressive symptoms with a significant difference	1; 3; 6; 12	5/7
Depression	Bogner et al. 2012 [24]	USA	RCT	Diabetes*	I: 94 (70) C: 88 (66)	I: 57.8 (9.4) C: 57.1 (9.6)	-	PHQ-9	The intervention group was more likely to achieve remission of depression compared to the control group with a significant difference.	4	7/7
Depression	Chen et al. 2018 [36]	China	RCT	Heart Failure	I: 31 (29) C: 31 (52)	I: 61.1 (14.2) C: 62.4 (14.9)	-	PHQ-9	The intervention group experienced an improvement in depressive symptoms with a significant difference	3; 6	7/7
Depression	Connor et al. 2019 [37]	USA	RCT	Parkinson's disease	I: 162 (4) C: 166 (1)	I: 69.6 (10.1) C: 71.3 (9.2)	-	PHQ-9	The intervention group experiences less depression feeling, but no significant difference was found	6; 12; 18	7/7
Depression	Crowley et al. 2016 [51]	United Kingdom	Non-rando mized	Diabetes*	I: 23 (0) C: 23 (8)	I: 60 (8.4) C: 60 (9.2)	-	PHQ-9	The intervention had no impact on depression scores	3; 6	6/9
Depression	Ell et al. 2008 [29]	USA	RCT	Cancer	I: 242 (84) C: 230 (86)	I: - C: -	-	PHQ-9	The intervention group experienced an improvement in depressive symptoms and the difference was borderline significant	6; 12	6/7
Depression	Gellis et al. 2012 [39]	USA	RCT	Heart Failure and/or COPD	I: 57 (63) C: 58 (69)	I: 80.1 (7.8) C: 78.3 (6.9)	-	PHQ-9 CES-D	The intervention group experiences reductions in depressive symptoms with a significant difference	12	7/7
Depression	Johnson et al. 2014 [52]	Canada	Non-rando mized	Diabetes*	I: 95 (61) C: 71 (56)	I: 57.0 (10.5) C: 63.4 (11.3)	-	PHQ-9	The intervention group experienced greater improvements in depression scores with a significant difference	6; 12	7/9
Depression	Kalter-Leibovici et al. 2017 [26]	Israel	RCT	Heart Failure	I: 682 (31) C: 678 (24)	I: 70.8 (11.6) C: 70.7 (11.0)	-	PHQ-9	The intervention group was less likely to experience moderate-to-severe depression symptoms	12	5/7
Depression	Morgan et al. 2013 [43]	Australia	RCT	Diabetes* and/or Heart Failure	I: 170 (48) C: 147 (45)	I: 68.0 (11.7) C: 67.6 (11.2)	-	PHQ-9	Depression scores were significantly lower for patients in the intervention group compared to the control group	12	4/7
Depression	Riegel et al. 2006 [44]	USA	RCT	Heart Failure	I: 69 (58) C: 65 (49)	I: 71.6 (10.8) C: 72.7 (11.2)	-	PHQ-9	No significant group differences were found in depression scores	6	6/7
Depression	Wu et al. 2018 [49] ¹	USA	RCT	Diabetes*	I: 461 (59) C: 416 (70)	I: 51.9 (9.3) C: 55.2 (9.2)	-	PHQ-9 SCL-20	The intervention group experienced an improvement in depressive symptoms with a	6, 12	3/7

											significant difference	
Depression	Katon et al. 2010 [34]	USA	RCT	Diabetes* and/or Heart Failure	I: 106 (48) C: 108 (56)	I: 57.4 (10.5) C: 56.3 (12.1)	-	SCL-20	The intervention group experienced an improvement in depressive symptoms with a significant difference	6,12	6/7	
Depression	Williams et al. 2004 [48]	USA	RCT	Diabetes*	I: 205 (54) C: 212 (53)	I: 70.1 (6.9) C: 70.3 (7.1)	-	SCL-20	The intervention group experienced an improvement in depressive symptoms with a significant difference	3; 6; 12	7/7	
Depression	Lu et al. 2020 [27]	Taiwan	Non-rando mized	Rheumatoid Arthritis	I: 50 (76) C: 46 (89)	I: 56.6 (10.3) C: 50.7 (10.8)	-	TDQ	Depression scores were significantly lower for patients in the intervention group compared to the control group	3; 6	3/9	

NR: not reported; *:Diabetes mellitus type 2; N: number of participants; RCT: Randomized Controlled Trial; I: Intervention group; -: not measured; C: Control group; CES-D: Center for Epidemiological Studies; GAD-7: 7-item General Anxiety Disorder; HADS: Hospital Anxiety/Depression Scale; PHQ-9: 9-item Patient Health Questionnaire; SCL-20: Symptom Checklist-20; TDQ: Taiwanese Depression Questionnaire; ** no clear follow-up time frame; *** quality score on basis of Cochrane Handbook for Systematic Reviews of Interventions and ROBINS-I tool.

¹ next to a case management intervention and a usual care group, this study included a third group receiving technology facilitated care; as this exceeds the scope of this review, this group was not included in further analyses.

TABLE 3: Specific case management strategies used per study interventions

Study (Author, year)	Development & reviewing of individualized care plans	Screening and monitoring			MCC*	Use of evidence- based guidelines	Support/ training for involved HCPs	Education		Assistance social/ financial support	Continuous contact		
		Therapy adherence	Medication review	Monitoring				Education/ Information material	Self- management skills		Tele- phone	Mail/ chat	In- person
Avci et al. 2019 [51]	NR	NR	NR	+	NR	NR	NR	+	+	NR	+	+	+
Bogner et al. 2012 [24]	NR	+	+	+	NR	+	+	+	NR	NR	+	NR	+
Callahan et al. 2006 [36]	+	+	+	+	+	+	+	+	+	+	+	NR	+
Chen et al. 2018 [37]	NR	+	NR	+	NR	NR	NR	+	+	NR	+	NR	+
Connor et al. 2019 [38]	+	NR	NR	+	NR	+	+	NR	+	NR	+	NR	NR
Crowley et al. 2016 [52]	NR	+	+	+	NR	NR	NR	+	+	NR	+	NR	NR
Egan et al. 2002 [25]	+	NR	NR	+	+	NR	NR	+	+	+	+	NR	NR
Ell et al. 2008 [29]	+	NR	NR	+	NR	+	NR	+	+	+	+	NR	+
Gabbay et al. 2013 [39]	NR	+	+	+	NR	NR	+	+	NR	NR	+	+	+
Gellis et al. 2012 [40]	NR	+	NR	+	NR	+	+	+	+	NR	+	NR	+
Hernandez et al. 2015 [41]	+	NR	NR	+	NR	NR	+	+	+	NR	+	NR	+
Johnson et al. 2014 [53]	+	+	NR	+	+	+	+	NR	+	NR	+	NR	+
Kalter-Leibovici et al. 2017 [26]	NR	+	+	+	NR	NR	NR	NR	+	NR	+	NR	+
Katon et al. 2010 [34]	NR	+	+	+	NR	+	NR	+	+	NR	NR	NR	+
Kroenke et al. 2010 [42]	NR	+	+	+	NR	+	NR	+	NR	NR	+	NR	NR
Lu et al. 2020 [27]	+	NR	+	+	NR	NR	NR	+	+	NR	+	NR	NR
Mertz et al. 2017 [43]	NR	NR	NR	+	NR	NR	NR	NR	+	NR	+	NR	+
Miklavcic et al 2020 [35]	NR	NR	NR	NR	+	+	+	+	+	+	NR	NR	+
Morgan et al. 2013 [44]	+	+	NR	+	NR	+	+	+	+	NR	NR	NR	+
Riegel et al. 2006 [45]	NR	+	NR	+	NR	+	NR	+	+	NR	+	NR	NR
Rose et al. 2017 [46]	+	+	NR	+	NR	NR	+	+	+	NR	+	NR	NR
Steel et al. 2016 [30]	NR	+	+	+	NR	NR	+	+	+	NR	+	NR	+
Stoop et al. 2015 [47]	NR	NR	NR	+	NR	+	NR	+	+	NR	NR	NR	+
Titova et al. 2015 [48]	+	NR	NR	NR	NR	NR	NR	+	+	NR	+	NR	+
Tsuchihashi-Makaya et al. 2013 [28]	NR	+	NR	+	NR	+	NR	+	NR	NR	+	NR	+
Williams et al. 2004 [49]	+	+	+	+	+	+	+	+	NR	NR	+	NR	+
Wu et al. 2018 [50]	NR	+	NR	+	NR	+	+	+	+	NR	+	NR	+

NR: Not reported or has not been part of the case management intervention; *MCC: Multidisciplinary Case Conference