Review article

A systematic review and meta-analysis of transdiagnostic interventions for common mental disorders in primary care

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ABSTRACT

Objective: In primary care, treating common mental disorders according to the ICD or DSM is challenging. A transdiagnostic approach may facilitate the management of mental health problems by treating across psychiatric diagnoses.
This meta-analysis aims to identify and compare transdiagnostic interventions delivered in primary care and to determine the effectiveness of these interventions, focusing on common mental disorders.
Methods: A systematic review and meta-analysis of randomized controlled trials (RCTs) was conducted by searching the databases Medline, Embase, Web of Science, and PsycINFO. Standardized mean differences (SMD) were calculated for the outcomes, and additional subgroup analyses were performed.
Results: From an initial set of 10,618 RCTs, 38 studies were included and retained for data extraction. Transdiagnostic interventions led to a significant reduction in symptoms of depression (SMD: −0.38) and anxiety (SMD: - 0.47). Treatment outcomes for somatoform disorders were not significant (SMD: - 0.22). About half of the interventions were provided by health professionals not specifically trained in psychotherapy; these interventions also proved to be effective (depression: SMD: −0.47; anxiety: −0.39).
Conclusion: This meta-analysis supports the use of transdiagnostic interventions for common mental disorders in primary care. Transdiagnostic interventions carried out by medical and health professionals not specifically trained in psychotherapy are feasible in PC, but emphasis should be placed on adequate training for them.
Trial registration: The protocol for this study is registered with PROSPERO: CRD42024459073, Date of registration: 2024/01/03.

1. Introduction

Mental disorders affect a large proportion of the world's population, accounting for approximately 13 % of the global burden of disease [1]. Studies show high prevalence rates, particularly for anxiety and depression, which are significant causes of disability and suffering worldwide [2,3]. Despite the prevalence and impact of mental health conditions, they often go untreated, leaving many people with little to no appropriate care [4]. Reasons for this include existing stigma, limited access to therapists with long waiting lists, and inadequate patient knowledge about treatment options and mental illness [5]. Consequences of the treatment gap are a reduced quality of life, increased healthcare costs, and decreased productivity, all of which contribute to an even greater socioeconomic burden for patients and society [6]. To address the lack of adequate care, integrating mental health treatment into primary care (PC) has emerged as an option, and its effectiveness

has already been tested in previous studies [7,8]. As a first point of contact for many patients [9], PC could play a valuable role in the early identification and treatment of mental disorders, the management of stable patients, and the referral to specialists to close the treatment gap [10–12].

However, barriers exist for providing an effective treatment of mental disorders in PC [13,14]. On the one hand, specific characteristics of PC account for difficulties, mainly being limited consultation times due to heavy workloads [15], a lack of specific training in mental health assessment [16], general practitioners (GPs) often leaning towards prescribing medication over counseling [17], and the proliferation of different treatment approaches for separate disorders. On the other hand, the way mental disorders manifest in PC presents challenges [18]. Symptoms are often subthreshold and nonspecific, which requires observing the course of the illness over a period of time [19]. Furthermore, there is a high rate of comorbidity of mental disorders, also including somatic disorders [20–22]. Classification systems are often difficult to apply because they were initially developed for clear and distinct symptoms, as opposed to the unspecific and often dimensional symptoms frequently presented by patients in PC [23–25].

Guided by the challenges mentioned above in managing mental disorders in PC, the rationale for the use of transdiagnostic psychological interventions in PC has been introduced in studies, and research has increased in recent years [26–30]. Unlike the traditional disorder-specific approach to diagnosis and treatment, the transdiagnostic approach aims to identify and address the underlying mechanisms and processes that are common to multiple mental disorders rather than treating each disorder as a separate and distinct condition [31]. These shared mechanisms are called transdiagnostic factors and include patterns of behavior, emotional regulation, or cognitive processes, regardless of diagnosis [32]. By targeting transdiagnostic factors and using techniques that work across disorders, a unifying treatment of different mental disorders is enabled [33]. The benefits of the transdiagnostic approach include more efficient treatment delivery as therapists can apply a "one-size-fits-all" solution to a multitude of mental health conditions and enhanced treatment effectiveness, as high rates of comorbidity are also addressed [34,35].

Although meta-analyses have shown that transdiagnostic psychological interventions prove to be effective in psychiatric settings, it is still unclear whether the transdiagnostic approach is an effective intervention for patients with common mental disorders in PC [36–40]. Therefore, this systematic review and meta-analysis aimed to provide an overview of the literature on randomized controlled trials of transdiagnostic interventions for common mental disorders in PC patients and to assess their short- and long-term effectiveness. Subgroup analyses of transdiagnostic interventions of different delivery (online tools vs. video consultations vs. in-person therapy) and therapy formats (group vs. individual therapy) as well as whether the intervention can be feasibly implemented by health and medical professionals in PC visits (vs. psychotherapy administered by trained professionals like psychotherapists or psychologists) were undertaken. To our knowledge, this is the first systematic review and meta-analysis of transdiagnostic interventions for common mental disorders in primary care that evaluates studies across treatment types and formats, thereby providing a more comprehensive analysis.

2. Methods

2.1. Protocol and registration

This review was registered with PROSPERO [CRD42024459073] on January 3rd, 2024, and is reported in accordance with the PRISMA guidelines [41] as well as with the Cochrane.

Handbook for systematic reviews [42].

2.2. Search strategy and study selection

2.2.1. Literature search

A comprehensive literature search was conducted to identify transdiagnostic interventions for common mental disorders in PC. The databases Medline, Embase, Web of Science, and PsycINFO were searched from inception to January 2024 (January 2nd, 2024). Reference lists of relevant studies were also reviewed. An exemplary search strategy can be found in Appendix 1.

2.2.2. Inclusion criteria

Studies were included if they met the following criteria (PICOS): *Participants* had to be adults with common mental health problems (i.e., anxiety, depressive and somatic symptoms) in a PC setting [43] [44]., No specific symptom score cutoffs were required. Transdiagnostic psychological *interventions* treating at least two common mental disorders were included, with no limitations concerning the delivery format. As a *comparison,* usual care, waitlist, or active treatment were eligible. *Outcomes* focused on changes in self-reported symptom scores (i.e., primary outcomes), delivery format, therapy format and feasibility of the intervention for PC (i.e., secondary outcomes). The *study design* was limited to published randomized controlled trials written in English or German.

2.2.3. Exclusion criteria

We excluded all therapy formats that were not based on psychotherapy (i.e., physical activity, acupuncture, pharmacotherapy) as well as those with insufficient data or outcome reporting.

2.3. Data extraction and analysis

An initial search was performed by three reviewers (MV, CE, HA) on January 2nd, 2024. After de-duplication, relevant studies were uploaded into the software Covidence [45] to screen titles and abstracts. Full-text articles were then obtained and assessed for eligibility by the same three reviewers (MV, CE, HA). Any conflicts or disagreements were highlighted, and agreement was reached through discussion. After further removal of studies due to insufficient outcome data or incorrect study design, the data of a final set of studies were finally reviewed. From the final set of studies, the following study characteristics and outcome measures were extracted into a Microsoft Excel [46] spreadsheet by two reviewers (HA, MV): authors, year of publication, country, setting, inclusion and exclusion criteria; age, gender, diseases, and comorbidities of patients; type of intervention treatment, type of control treatment, provider of intervention, delivery and therapy format, duration of intervention. Primary outcome data assessing depression, anxiety, and somatoform symptoms, as well as transdiagnostic measures (e.g., assessment of psychological distress through the GHQ-12 [47], BSI [48], or CIS-R [49]), were also extracted.

2.4. Quality assessment

The quality of each study and risk of bias were assessed by two reviewers (MV, HA) using the Cochrane Collaboration risk of bias tool (RoB 2) [50]. The following criteria were evaluated: randomization process, deviations from intended interventions, missing outcome data, measurement of the outcome, and selection of the reported outcomes.

2.5. Meta-analyses

Data from self-reported outcome measures (i.e., depression, anxiety, somatoform symptoms, transdiagnostic measures) at baseline, post-intervention (i.e., immediately after the intervention), and follow-up assessments were used for statistical analysis. Regarding follow-up assessments, studies were grouped in follow-up assessments less than six months post-baseline, six months post-baseline, and more than six months post-baseline. The software RevMan [51] by Cochrane was

utilized to calculate standardized mean differences (SMD), employing random-effects models to account for the variability between study populations. Forest plots were generated for primary outcomes at post-intervention. Additional subgroup analyses focusing on the delivery format (online tools vs. video consultations vs. in-person therapy), the therapy format (group vs. individual therapy) and the feasibility of the intervention for PC were also performed. The proportion of total variation in study effect sizes attributed to heterogeneity was assessed using I^2 statistics. A sensitivity analysis was conducted to test whether different time points of follow-up assessments affected the results by using data from the closest time point to the baseline assessment without distinguishing between post-intervention and follow-up assessments. Finally, publication bias was assessed by generating funnel plots of the primary outcome analyses.

3. Results

3.1. Literature search flow

The initial search resulted in 10,618 possible studies. After the removal of duplicates and the title and abstract screen, 170 full-text articles were obtained and assessed for eligibility. After further removing 88 studies because of insufficient outcome data, incorrect study design, or because the studies were secondary analyses of already included studies, data from 38 studies were finally extracted for the meta-analysis (Fig. 1).

3.2. Study characteristics

Study characteristics are presented in Table 1. Trials were conducted in fifteen different countries from 1994 to 2023. In total, 485 practices were enrolled, enlisting between 100 and 200 patients for a total of 7175 PC patients across all included studies. All participants were defined as primary care patients. Most studies were set in PC practices (78 %). Some interventions were delivered in community health centers, mindfulness study centers or mental health units. Studies assessed pre-treatment characteristics using structured interviews (including the K10 [52], GAD-7 [53], PHQ-9 [54], SCID interview [55], or the GHQ-12 [56]). The majority of studies focused on treating anxiety (78 %) or depressive symptoms (68 %). 11 % of the studies evaluated the treatment of somatoform symptoms. Other mental health conditions treated were mental health problems, stress-related mental disorders, psychological problems, adjustment disorders and common mental disorders not further specified (34 % in total). The study population was predominantly female (67 % female in both intervention and control groups). The mean age of the study population was 44 years ($SD = 9$ years) in both intervention and control groups.

3.3. Quality assessment

The risk of bias was moderate in most studies. This was mainly because participants were aware of their assigned treatment during the trial, data were unavailable for all outcomes, and the outcome assessors were the patients themselves (detailed assessment in Table 1).
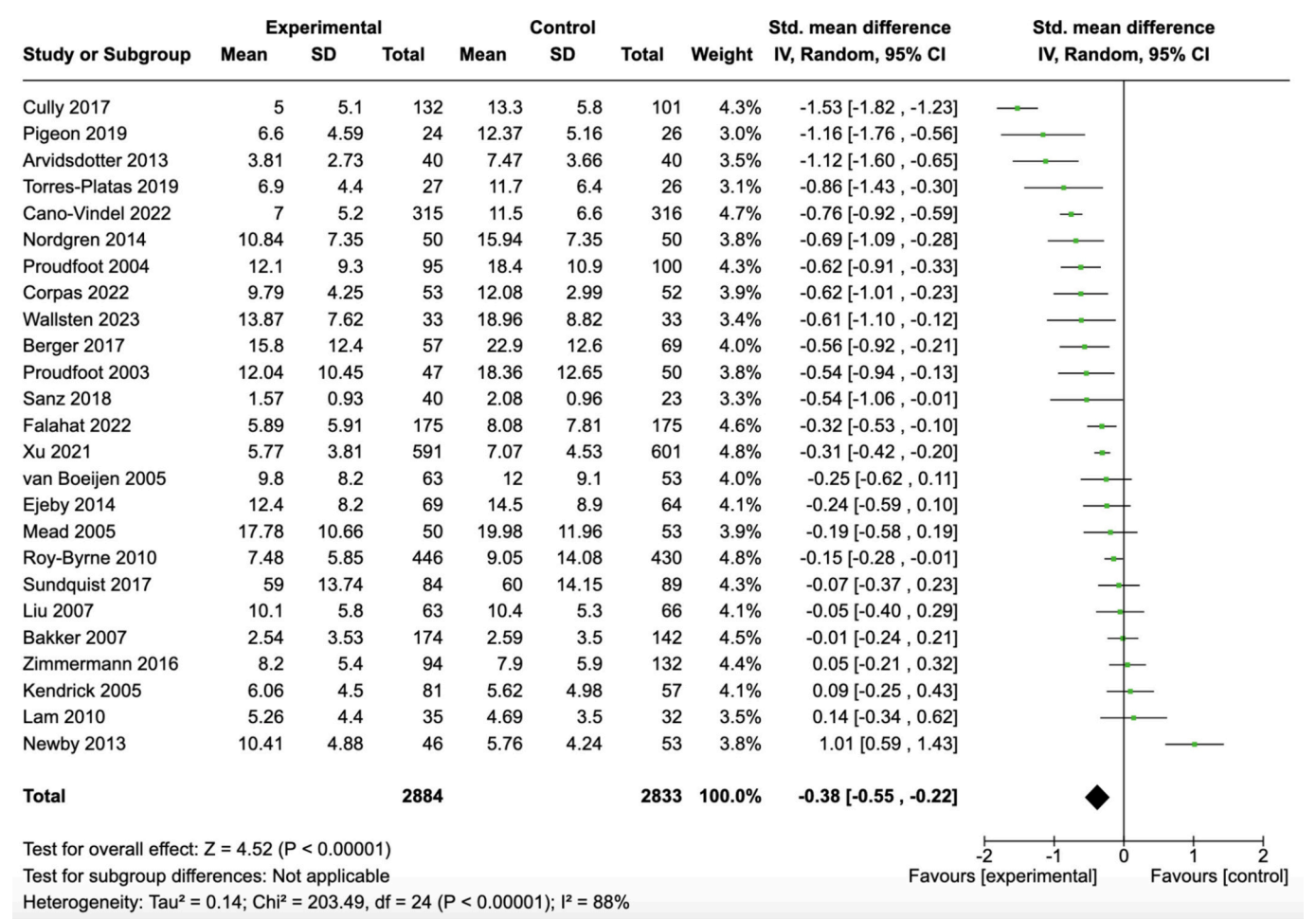
Study or Subgroup	Experimental			Control			Weight	Std. mean difference IV, Random, 95% CI	Std. mean difference IV, Random, 95% CI
	Mean	SD	Total	Mean	SD	Total			
Cully 2017	5	5.1	132	13.3	5.8	101	4.3%	-1.53 [-1.82 , -1.23]	
Pigeon 2019	6.6	4.59	24	12.37	5.16	26	3.0%	-1.16 [-1.76 , -0.56]	
Arvidsdotter 2013	3.81	2.73	40	7.47	3.66	40	3.5%	-1.12 [-1.60 , -0.65]	
Torres-Platas 2019	6.9	4.4	27	11.7	6.4	26	3.1%	-0.86 [-1.43 , -0.30]	
Cano-Vindel 2022	7	5.2	315	11.5	6.6	316	4.7%	-0.76 [-0.92 , -0.59]	
Nordgren 2014	10.84	7.35	50	15.94	7.35	50	3.8%	-0.69 [-1.09 , -0.28]	
Proudfoot 2004	12.1	9.3	95	18.4	10.9	100	4.3%	-0.62 [-0.91 , -0.33]	
Corpas 2022	9.79	4.25	53	12.08	2.99	52	3.9%	-0.62 [-1.01 , -0.23]	
Wallsten 2023	13.87	7.62	33	18.96	8.82	33	3.4%	-0.61 [-1.10 , -0.12]	
Berger 2017	15.8	12.4	57	22.9	12.6	69	4.0%	-0.56 [-0.92 , -0.21]	
Proudfoot 2003	12.04	10.45	47	18.36	12.65	50	3.8%	-0.54 [-0.94 , -0.13]	
Sanz 2018	1.57	0.93	40	2.08	0.96	23	3.3%	-0.54 [-1.06 , -0.01]	
Falahat 2022	5.89	5.91	175	8.08	7.81	175	4.6%	-0.32 [-0.53 , -0.10]	
Xu 2021	5.77	3.81	591	7.07	4.53	601	4.8%	-0.31 [-0.42 , -0.20]	
van Boeijen 2005	9.8	8.2	63	12	9.1	53	4.0%	-0.25 [-0.62 , 0.11]	
Ejeby 2014	12.4	8.2	69	14.5	8.9	64	4.1%	-0.24 [-0.59 , 0.10]	
Mead 2005	17.78	10.66	50	19.98	11.96	53	3.9%	-0.19 [-0.58 , 0.19]	
Roy-Byrne 2010	7.48	5.85	446	9.05	14.08	430	4.8%	-0.15 [-0.28 , -0.01]	
Sundquist 2017	59	13.74	84	60	14.15	89	4.3%	-0.07 [-0.37 , 0.23]	
Liu 2007	10.1	5.8	63	10.4	5.3	66	4.1%	-0.05 [-0.40 , 0.29]	
Bakker 2007	2.54	3.53	174	2.59	3.5	142	4.5%	-0.01 [-0.24 , 0.21]	
Zimmermann 2016	8.2	5.4	94	7.9	5.9	132	4.4%	0.05 [-0.21 , 0.32]	
Kendrick 2005	6.06	4.5	81	5.62	4.98	57	4.1%	0.09 [-0.25 , 0.43]	
Lam 2010	5.26	4.4	35	4.69	3.5	32	3.5%	0.14 [-0.34 , 0.62]	
Newby 2013	10.41	4.88	46	5.76	4.24	53	3.8%	1.01 [0.59 , 1.43]	
Total			**2884**			**2833**	**100.0%**	**-0.38 [-0.55 , -0.22]**	

Test for overall effect: Z = 4.52 (P < 0.00001)
Test for subgroup differences: Not applicable
Heterogeneity: Tau² = 0.14; Chi² = 203.49, df = 24 (P < 0.00001); I² = 88%

Favours [experimental]   Favours [control]

Fig. 1. Forest plot of all studies describing depressive symptoms at post-intervention.

Table 1

Study characteristics of the included trials.

Study	Participants	Baseline Measurement for Inclusion	Diagnoses	Intervention (Provider)		Format	Diagnostic Measure			Quality Assessment						
				IG	CG		Depression	Anxiety	Somatoform	D1a	D1b	D2	D3	D4	D5	Ω
Berger, 2016 (CH)	n = 120 Ø age: 41.95 f: 71 %	SCID, diagnosis	anxiety disorders	transdiagnostic unguided Internet intervention ('velibra') (no contact)	TAU (GP)	Online Tool (unguided intervention)	BDI	Beck Anxiety Inventory	SOMS	+	/	+	!	!	!	!
Roy-Byrne, 2010 (USA)	n = 1004 Ø age: 43.5 f: 71 %	M.I.N.I., 8 on OASIS	depression, anxiety, PTSD	CBT (psycho-therapist)	TAU (GP)	In person	PHQ-9	Anxiety Sensitivity Index		+	/	!	+	!	!	!
Schreuders, 2017 (NL)	n = 130 Ø age: 52.9 f: 71 %	GHQ-12, frequent visits	mental health problems	PST (nurse)	TAU (GP)	In person	HADS	HADS		+	/	!	−	!	+	−
Arvisdotter, 2013 (SE)	n = 72 Ø age: 40.5 f: 83 %	symptoms	complaints of psychological distress	Integrative Treatment (psycho-therapist)	TAU (GP)	In person	HADS	HADS		+	/	!	!	!	!	!
Luutonen, 2009 (FI)	n = 56 Ø age: 52.55 f: 84 %	frequent visits	frequent visits at GP practices	CBT (student)	TAU (GP)	In person	Beck Depression Inventory		SCL-SOM	+	/	!	!	!	+	!
Friedlr, 1997 (UK)	n = 117 Ø age: 39 f: 81 %	symptoms	depression, anxiety, other mental disorder symptoms	brief psychotherapy (psycho-therapist)	TAU (GP)	In person	Beck Depression Inventory			+	/	!	!	!	!	!
Van Boeijen, 2005 (NL)	n = 89 Ø age: 38.4 f: 64.5 %	SSI, SCID	panic disorder, GAD	CBT (psycho-therapist)	TAU (GP)	In person	BDI	STAI_state		!	!	!	!	!	!	!
Sundquist, 2017 (SE)	n = 196 Ø age: 41.5 f: 85.5 %	diagnosis, MADRS	depressive, anxiety and/or stress and adjustment disorders	MB (psycho-therapist)	TAU (GP)	In person group therapy	SCL-90	SCL-90	SCL-90	+	/	!	!	!	!	!
Lam, 2009 (Hong Kong)	n = 299 Ø age: 71.8 f: 56.85 %	HADS	psychological problems	PST (GP)	Placebo video group (GP)	In person	HADS	HADS		+	/	!	!	!	!	!
Cano-Vindel, 2021 (ES)	n = 388 Ø age: NA f: 81.15 %	emotional disorder, PHQ-9	emotional disorders	CBT (psycho-therapist)	TAU (GP)	In person group therapy	PHQ-9	GAD-7	PHQ-15	+	/	!	!	!	+	!
Latif, 2020 (CA)	n = 39 Ø age: 34.42 f: 53.70 %	HADS	depression, anxiety	CBT-informed guided self-help (research assistant)	TAU (GP)	Online tool	HADS	HADS		+	/	!	+	!	+	!
Pigeon, 2019 (USA)	n = 50 Ø age: 54.8 f: 20 %	C-SSR, diagnosis, PHQ-9	insomnia, depression, PTSD	CBT (psycho-therapist)	TAU (GP)	In person	PHQ-9			+	/	!	!	!	!	!
Tönnies, 2021 (DL)	n = 45 Ø age: 48.55 f: 70 %	PHQ-9, GAD-7	depression, anxiety	Video Consultations (psycho-therapist)	TAU (GP)	Online (video consultations)	PHQ-9	GAD-7	SSD-12	+	/	!	!	!	+	!
Falahat, 2021 (IR)	n = 459 Ø age: 34.92 f: 88 %	Mental health screening tools, diagnosis	common mental health problems	Transdiagnostic mental health intervention (nurse)	mental health service (GP)	In person	Depression	Anxiety		+	/	!	!	!	+	!

(continued on next page)

Table 1 (*continued*)

Study	Participants	Baseline Measurement for Inclusion	Diagnoses	Intervention (Provider)		Format	Diagnostic Measure			Quality Assessment						
				IG	CG		Depression	Anxiety	Somatoform	D1a	D1b	D2	D3	D4	D5	Ω
Torres-Platas, 2019 (CA)	n = 53 Ø age: 67.8 f: 71.8 %	PHQ-9, GAD-7	moderate depression or anxiety	MB (psychotherapist, psychiatry resident, social worker)	TAU (GP)	In person group therapy	PHQ-9	GAD-7		+	/	!	!	!	+	!
Roberge, 2022 (CA)	n = 231 Ø age: 37 f: 85.5 %	diagnosis	panic disorder, agoraphobia, social anxiety disorder, and/or GAD	CBT (psycho-therapist)	TAU (GP)	In person group therapy		BAI		+	/	!	!	!	+	!
Corpas, 2021 (ES)	n = 105 Ø age: 39.56 f: 68.6 %	GAD-7, PHQ-15, PHQ-9, PHQ-PD	mild/moderate clinical symptoms of somatoform, anxiety and/or depression disorders	Brief transdiagnostic intervention (psycholo-gist)	TAU (GP)	In person	PHQ-9	GAD-7	PHQ-15	+	/	!	!	!	!	!
Proudfoot, 2004 (AU)	n = 274 Ø age: 43.5 f: 74 %	GHQ-12, CIS-R	depression, mixed anxiety	Computerised CBT ('Beating the Blues') (nurse)	TAU (GP)	Online (video consultation & videotape)	BDI	BAI		+	/	!	!	!	!	!
Xu, 2020 (CN)	n = 1042 Ø age: 63.36 f: 66.58 %	PHQ-9, GAD-7	anxiety, depression	CBT (GP)	TAU (GP)	In person group therapy	PHQ-9	GAD-7		+	+	!	!	!	!	!
Liu, 2007 (TW)	n = 129 Ø age: 44.4 f: 84 %	CIS-R	depression, anxiety	PST (psychologist, psychiatric social worker, nurses)	TAU (GP)	In person	CIS-R, HRSD			!	/	!	!	!	!	!
Bakker, 2007 (NL)	n = 306 Ø age: 40.74 f: 66 %	symptoms	depression, anxiety	Brief intervention (GP)	TAU (GP)	In person	4DSQ	4DSQ	4DSQ	+	+	!	!	!	+	!
King, 2000 (UK)	n = 107 Ø age: 36.5 f: 76.5 %	symptoms	anxiety, depression	CBT (psycho-gist)	TAU (GP)	In person	BDI			−	/	!	!	!	+	−
Zimmermann, 2016 (DL)	n = 168 Ø age: 40.1 f: 66.7 %	PHQ-9	anxiety, depressive or somatic symptoms	self-management support (nurse)	TAU (GP)	In person	PHQ-9	PHQ	PHQ	+	+	!	!	!	+	!
Ejeby, 2013 (SE)	n = 159 Ø age: 44.15 f: 78.85 %	symptoms	common mental disorders	CBT (psycho-gist)	TAU (GP)	In person group therapy	CPRS-S-A	CPRS-S-A		+	/	!	+	!	+	!
Nordgren, 2013 (SE)	n = 89 Ø age: 35.5 f: 63 %	diagnosis	mixed anxiety and comorbidities	CBT (student)	wait list (psycho-therapist)	Online Tool + therapist support via messages	CORE-OM, MADRS-S	BAI		+		!	+	!	+	!
Proudfoot, 2003 (AU)	n = 91 Ø age: 44.7 f: 73.5 %	GHQ-12, PROQSY	anxiety, depression	Computerised CBT ('Beating the Blues') (nurse)	TAU (GP)	Online (video consultation & videotape)	BDI	BAI		+	/	!	!	!	+	!
Mynors-Wallis, 1996 (UK)	n = / Ø age: / f: /	symptoms	emotional disorders	PST (nurse)	TAU (GP)	In person				+	/	!	!	!	!	!
Boot, 1994 (UK)	n = 108 Ø age: 39 f: 65 %	symptoms	anxiety, depression	Counseling (counsellor)	TAU (GP)	In person				+	/	!	+	!	!	!

Table 1 (*continued*)

Study	Participants	Baseline Measurement for Inclusion	Diagnoses	Intervention (Provider)		Format	Diagnostic Measure			Quality Assessment						
				IG	CG		Depression	Anxiety	Somatoform	D1a	D1b	D2	D3	D4	D5	Ω
Kendrick, 2005 (UK)	n = 155 Ø age: 35.35 f: 70.5 %	symptoms, GHQ-12	depression, anxiety	PST (nurse)	TAU (GP)	In person	HADS-D	HADS-A		+	/	+	!	!	+	!
Mathieson, 2019 (NZ)	n = 139 Ø age: - f: 71 %	K10	mild-to-moderate levels of psychological distress	Ultrabrief intervention (GP)	TAU (GP)	In person	HADS-D	HADS-A		+	+	!	!	!	!	!
Morris, 2023 (UK)	n = 156 Ø age: 41.25 f: 56.45 %	symptoms	mild to moderate common mental health problems	Perceptual Control Therapy ('The Take Control Course') (psycho-therapist)	CBT guided self-help intervention (GP)	In person group therapy	PHQ-9	GAD-7		+	/	!	+	!	+	!
Lang, 2006 (USA)	n = 62 Ø age: 46.6 f: 53 %	BSI-18	depression, anxiety, somatoform disorder	Brief mental health intervention ('Play Your Cards Right') (psycho-therapist)	TAU (GP)	In person or via telephone	BSI Depression	BSI Anxiety		+	/	!	!	!	!	!
Francis, 2022 (AU)	n = 118 Ø age: / f: 72.5 %	K10	depression, anxiety	Mindfulness integrated CBT (psycholo-gist)	TAU (GP)	In person group therapy	DASS-21 Depression	DASS-21 Anxiety		+	/	!	!	!	+	!
Cully, 2017 (USA)	n = 302 Ø age: 65.5 f: 5.5 %	Symptoms, PRIME-MD screener	depression, anxiety	Brief cognitive behavioral therapy (staff mental health providers)	EUC (GP)	In person	PHQ-9	BAI		+	/	!	+	!	!	!
Wallsten, 2023 (Sweden)	n = 73 Ø age: 47.7 f: 73.5 %	symptoms	depression, anxiety, insomnia	CBT (psychologist)	Waiting List	In person group therapy	MADRS	OASIS		+	/	!	!	!	+	!
Sanz-Cruces, 2017 (Spain)	n = 63 Ø age: 41.95 f: 50 %	symptoms	depression, anxiety, adjustment disorder	CBT (resident)	Waiting List	In person group therapy	SCL-90-R	SCL-90-R		+	/	!	!	!	+	!
Mead, 2005 (GB)	n = 114 Ø age: 40.8 f: 67.5 %	Symptoms (BDI, HADS)	depression, anxiety	Guided Self-Help (psychologist)	TAU (GP)	In person	BDI	HADS		+	/	!	+	!	+	!
Newby, 2013 (Australia)	n = 109 Ø age: 44.25 f: 77.5 %	Symptoms (K−10)	depression, anxiety	Internet CBT ('The Worry and Sadness Program') (no contact)	Waiting List	Online Tool	PHQ-9	GAD-7		+	/	!	+	!	!	!

Abbreviations IG = Intervention Group, CG = Control Group, TAU = treatment as usual, GP = General Practitioner, CBT = cognitive behavioral therapy, PST = problem-solving therapy, MB = Mindfulness Based Therapy, SE = Sweden, AU = Australia, UK = United Kingdom, USA = United States of America, NZ = New Zealand, CH = Switzerland, DL = Germany, NL = Netherlands, TW = Taiwan, ES = Spain, CN = Canada, IR = Ireland, FI = Finland, n = Number of participants, f = percentage of female participants, M.I.N.I. = Mini-international Neuropsychiatric Interview, CORE-OM = Clinical Outcomes in Routine Evaluation-Outcome Measure, MADRS-S = Montgomery–Åsberg Depression Rating Scale self-rating version, BAI = Beck's Anxiety Inventory, GHQ-12 = General Health Questionnaire-12, PROQSY = Clinical Interview Schedule-Revised, BDI = Beck's Depression Inventory, HADS-D = Hospital Anxiety and Depression Scale - Deutsche Version, HADS = Hospital Anxiety and Depression Scale, K10 = Kessler Psychological Distress Scale, PHQ-9 = Patient Health Questionnaire-9, GAD-7 = Generalised Anxiety Disorder Scale-7, BSI = Brief Symptom Inventory, BSI-18 = Brief Symptom Inventory-18, DASS-21 = Depressions-Angst-Stress-Skalen-21, SCID = Structured Clinical Interview for DSM-5, CPRS = Comprehensive Psychopathological Rating Scale, CPRS-S-A = CPRS Self-rating Scale for Affective Syndromes, 4DSQ = Four-Dimensional Symptom Questionnaire, CIS-R = Clinical Interview Schedule Revised, SSI = Short and Simple Screening Interview, SSD-12 = Somatic Symptom Disorder - B Criteria Scale, PHQ-15 = Patient Health Questionnaire-15, PHQ-PD = Patient Health Questionnaire-Panic Disorder, HRSD = Hamilton Rating Scale for Depression, C-SSR = Columbia-Suicide Severity Rating Scale, STAI = State Trait Anxiety Inventory, SCL-90 = Symptom Checkliste-90, OASIS = Overall Anxiety Severity and Impairment Scale, SOMS = Screening für Somatoforme Störungen, PD = Panic Disorder, GAD = Generalised Anxiety Disorder, SAD = Social Anxiety Disorder, PTSD = Post-traumatic Stress Disorder, EUC = enhanced usual car.

3.4. Interventions

The majority of studies compared cognitive behavioral therapy (39 %) or problem-solving therapy (13 %) to treatment as usual (TAU) (79 %). The intervention group treatment was mainly delivered by a psychotherapist (32 %), psychologist (21 %), or nurse (16 %). The GP delivered the intervention in only four studies. In contrast, the control group treatment was almost always provided by the GP (89 %). Concerning the intervention, the average session length was 1.2 h. The mean duration of the period of the intervention was 8.5 weeks, with the shortest being a single session and the longest being administered over a period of 16 weeks. The average number of treatment sessions was seven (*SD* = 2.88). Relative to interventions conducted by medical and health professionals, the duration of the intervention was shorter (50 min vs. 80 min) and consisted of fewer sessions than in studies focusing on interventions led by trained professionals (5 vs. 8 sessions). Most interventions were delivered individually (71 %) and in person (82 %). Of the eight studies that used online formats, four studies used an online tool to deliver the intervention (15 %) and three used video consultations (7 %), delivered by a psychotherapist or nurse. Group sessions were used in eleven studies (28 %), with an average group size of ten patients.

3.5. Primary outcomes

3.5.1. How effective are transdiagnostic interventions in primary care?

The first set of analyses evaluated short-term effectiveness for depression, anxiety, and somatoform symptoms at post-intervention (i. e., immediately after completion of the intervention) (Figs. 1, 2, and Table 2). The calculation of SMD showed moderate effect sizes for depression (SMD: - 0.38; 95 % CI: - 0.55, −0.22; I^2 = 88 %) and anxiety (SMD: - 0.47; 95 % CI: - 0.60, − 0.33; I^2 = 82 %). The evaluation of somatoform symptoms showed a non-significant treatment effect (SMD: - 0.22; 95 % CI: - 0.52, 0.08; I^2 = 87 %) (Table 2). The analysis of transdiagnostic measures (e.g., assessment of psychological distress) also showed significant and comparable effect sizes (SMD: - 0.30; 95 % CI: - 0.40, − 0.20; I^2 = 0 %) (Table 2).

In addition to the short-term effectiveness, analyses were conducted for long-term effectiveness examining the effects of three follow-up time points (assessment less than six months post-baseline, six months post-baseline, and more than six months post-baseline) (Table 2). For depression and anxiety, effect sizes were comparable at six months and only slightly decreased over time (e.g., six months follow-up: depression (SMD: - 0.22; 95 % CI: - 0.35, − 0.10); anxiety (SMD: - 0.26; 95 % CI: - 0.38, − 0.14). Analyses could not be performed for somatoform symptoms due to insufficient data. As effect sizes were consistent over time, only post-intervention assessment data were used for subgroup analyses.

3.6. Sensitivity Analysis

A sensitivity analysis was performed to examine whether the results were affected by different time point assessment of outcomes. The analysis showed consistent results for standardized mean differences (depression: SMD: - 0.38; 95 % CI: - 0.51, − 0.26; anxiety: SMD: - 0.43; 95 % CI: - 0.59, − 0.27). Thus, we opted to only use post-intervention data for subgroup analyses to reduce potential result heterogeneity.

3.7. Subgroup analyses

3.7.1. Does the format of the transdiagnostic intervention influence the treatment outcome?

3.7.1.1. Subgroup Analysis of delivery formats. To examine the effect of delivery formats, online and in-person therapy were compared (Table 2). In terms of online therapy, it was further distinguished between the use of online tools and video consultations. For depression, the use of online tools (SMD: -0.54; 95 % CI: −0.98, −0.10) was equally effective than video consultations (SMD: -0.54; 95 % CI: −0.75, −0.32) and more effective than in-person therapy (SMD: -0.40; 95 % CI: −0.58, −0.23). For anxiety outcomes, online tools (SMD: -1.05; 95 % CI: −1.74, −0.36) were more effective than both in-person therapy (SMD: -0.38; 95 % CI: −0.53, −0.24) and video consultations (SMD: -0.36; 95 % CI: −0.58, 0.14).

3.7.1.2. Subgroup analysis of therapy formats. In addition, therapy formats (group vs. individual) for depression and anxiety symptoms were compared (Table 2): group therapy (depression: SMD: -0.47; 95 % CI: - 0.68, − 0.26); anxiety: SMD: - 0.56; 95 % CI: - 0.79, − 0.33) showed larger effect sizes than individual therapy (depression: SMD: -0.45; 95 % CI: −0.66, −0.23; anxiety: SMD: - 0.41; 95 % CI: - 0.59, − 0.24).

3.7.2. Can the intervention be feasibly implemented in PC?

A subgroup analysis was conducted to differentiate between those interventions that were delivered by professionals trained to deliver psychotherapy (e.g., psychotherapists and psychologists) and those interventions that were delivered by health and medical professionals (e. g., nurses, students, residents, GPs…). Self-help manuals and online tools without provider contact were excluded from this analysis. For depression and anxiety symptoms, the analysis showed significant effects for both subgroups. The interventions delivered by trained professionals proved to be more effective (depression: SMD: -0.47; 95 % CI: −0.68, −0.25; anxiety: SMD: -0.57; 95 % CI: −0.78, −0.35) than interventions delivered by other health and medical professionals (depression: SMD: -0.39; 95 % CI: −0.64, −0.13; anxiety: SMD: -0.27; 95 % CI: −0.40, −0.13).

3.8. Publication bias

Funnel plots were generated for the analyses of depression, anxiety, and somatoform outcomes at post-intervention. Funnel plots of depression and anxiety showed a noticeable square distribution at the upper limit, suggesting potential sources of publication bias or heterogeneity among the included studies (appendix 2). The funnel plot of somatoform outcomes is not reported because the small number of studies prevented adequate analysis.

4. Discussion

4.1. Summary of main findings

Mental disorders affect a large part of the population, especially patients in PC [57]. To enhance patient care, much research has been conducted recently to find new treatment options and ultimately improve healthcare services [58,59]. Treating patients with mental problems in the PC setting is one such proposal, and using transdiagnostic treatment approaches is another [60,61]. Thus, we conducted a systematic review and meta-analysis that synthesizes evidence from randomized controlled trials of transdiagnostic interventions for common mental disorders in PC across treatment types and formats.

Thirty-eight studies were identified, encompassing 7175 participants. The results provide moderate and statistically significant evidence for the effectiveness of transdiagnostic interventions of depression and anxiety in PC (effect sizes ranging from −0.38 (depression) to −0.47 (anxiety)). Results remained significant for both short-term (post-intervention assessment) and long-term (three follow-up time points) evaluation of treatment effects. Comparable meta-analyses found the use of transdiagnostic treatment approaches for these disorders in secondary and tertiary care to be effective, although they showed slightly higher effect sizes, ranging from 0.52 to 1.00 [62–68]. This difference might be explained by longer and more intensive treatment in
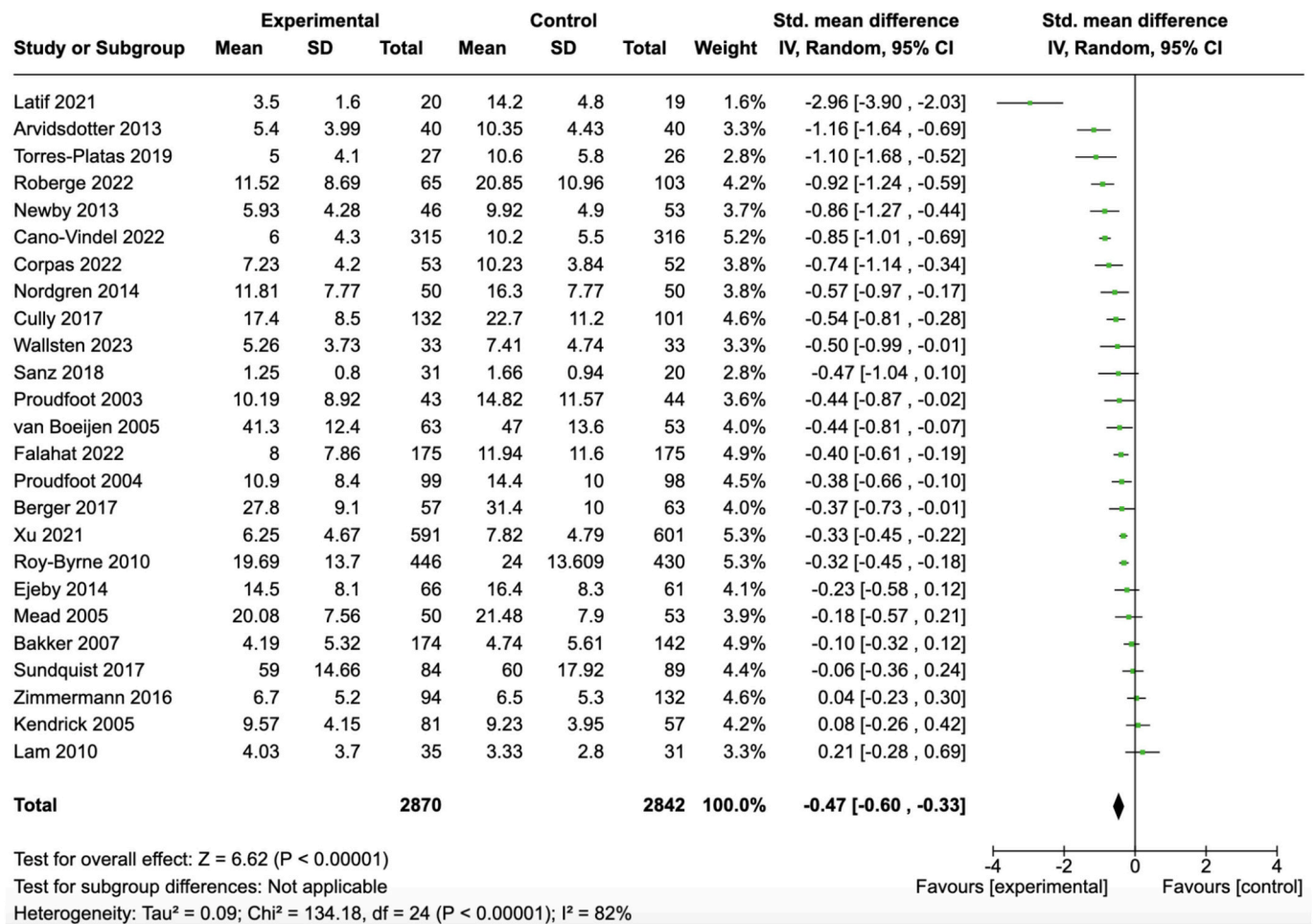
Study or Subgroup	Experimental Mean	SD	Total	Control Mean	SD	Total	Weight	Std. mean difference IV, Random, 95% CI
Latif 2021	3.5	1.6	20	14.2	4.8	19	1.6%	-2.96 [-3.90 , -2.03]
Arvidsdotter 2013	5.4	3.99	40	10.35	4.43	40	3.3%	-1.16 [-1.64 , -0.69]
Torres-Platas 2019	5	4.1	27	10.6	5.8	26	2.8%	-1.10 [-1.68 , -0.52]
Roberge 2022	11.52	8.69	65	20.85	10.96	103	4.2%	-0.92 [-1.24 , -0.59]
Newby 2013	5.93	4.28	46	9.92	4.9	53	3.7%	-0.86 [-1.27 , -0.44]
Cano-Vindel 2022	6	4.3	315	10.2	5.5	316	5.2%	-0.85 [-1.01 , -0.69]
Corpas 2022	7.23	4.2	53	10.23	3.84	52	3.8%	-0.74 [-1.14 , -0.34]
Nordgren 2014	11.81	7.77	50	16.3	7.77	50	3.8%	-0.57 [-0.97 , -0.17]
Cully 2017	17.4	8.5	132	22.7	11.2	101	4.6%	-0.54 [-0.81 , -0.28]
Wallsten 2023	5.26	3.73	33	7.41	4.74	33	3.3%	-0.50 [-0.99 , -0.01]
Sanz 2018	1.25	0.8	31	1.66	0.94	20	2.8%	-0.47 [-1.04 , 0.10]
Proudfoot 2003	10.19	8.92	43	14.82	11.57	44	3.6%	-0.44 [-0.87 , -0.02]
van Boeijen 2005	41.3	12.4	63	47	13.6	53	4.0%	-0.44 [-0.81 , -0.07]
Falahat 2022	8	7.86	175	11.94	11.6	175	4.9%	-0.40 [-0.61 , -0.19]
Proudfoot 2004	10.9	8.4	99	14.4	10	98	4.5%	-0.38 [-0.66 , -0.10]
Berger 2017	27.8	9.1	57	31.4	10	63	4.0%	-0.37 [-0.73 , -0.01]
Xu 2021	6.25	4.67	591	7.82	4.79	601	5.3%	-0.33 [-0.45 , -0.22]
Roy-Byrne 2010	19.69	13.7	446	24	13.609	430	5.3%	-0.32 [-0.45 , -0.18]
Ejeby 2014	14.5	8.1	66	16.4	8.3	61	4.1%	-0.23 [-0.58 , 0.12]
Mead 2005	20.08	7.56	50	21.48	7.9	53	3.9%	-0.18 [-0.57 , 0.21]
Bakker 2007	4.19	5.32	174	4.74	5.61	142	4.9%	-0.10 [-0.32 , 0.12]
Sundquist 2017	59	14.66	84	60	17.92	89	4.4%	-0.06 [-0.36 , 0.24]
Zimmermann 2016	6.7	5.2	94	6.5	5.3	132	4.6%	0.04 [-0.23 , 0.30]
Kendrick 2005	9.57	4.15	81	9.23	3.95	57	4.2%	0.08 [-0.26 , 0.42]
Lam 2010	4.03	3.7	35	3.33	2.8	31	3.3%	0.21 [-0.28 , 0.69]
Total			**2870**			**2842**	**100.0%**	**-0.47 [-0.60 , -0.33]**

Test for overall effect: Z = 6.62 (P < 0.00001)
Test for subgroup differences: Not applicable
Heterogeneity: Tau² = 0.09; Chi² = 134.18, df = 24 (P < 0.00001); I² = 82%

Fig. 2. Forest plot of all studies describing anxiety symptoms at post-intervention.

Table 2
Results of all subgroup analyses.

Meta Analyses		Measure	N	Heterogeneity I²	Test for subgroup differences Chi²	I²	Std. mean difference	95 % CI
Post-Intervention		Depression	25	88 %			−0.38	−0.55, −0.22
		Anxiety	25	82 %			−0.47	−0.60, −0.33
		Somatoform	5	85 %			−0.21	−0.50, 0.09
Follow-Up	Less than 6 months	Depression	11	78 %			−0.44	−0.68, −0.20
	After 6 months	Depression	10	47 %	3.00	33.4 %	−0.22	−0.35, −0.10
	More than 6 months	Depression	12	62 %			−0.20	−0.33, −0.08
	Less than 6 months	Anxiety	8	58 %			−0.17	−0.37, 0.03
	After 6 months	Anxiety	8	41 %	1.78	0 %	−0.26	−0.38, −0.14
	More than 6 months	Anxiety	10	67 %			−0.14	−0.27, −0.01
Feasibility in PC	Health Professional	Depression	11	90 %	0.23	86 %	−0.39	−0.64, −0.13
	Trained Professional	Depression	12	83 %			−0.47	−0.68, −0.25
	Health Professional	Anxiety	11	61 %	5.27	81 %	−0.27	−0.40, −0.13
	Trained Professional	Anxiety	11	83 %			−0.57	−0.78, −0.35
Format of Intervention	Group Therapy	Depression	8	77 %	0.03	0 %	−0.47	−0.68, −0.26
	Individual Therapy	Depression	17	88 %			−0.45	−0.66, −0.23
	Group Therapy	Anxiety	9	83 %	0.95	0 %	−0.56	−0.79, −0.33
	Individual Therapy	Anxiety	16	80 %			−0.41	−0.59, −0.24
Delivery of Intervention	Online Tool	Depression	4	81 %			−0.54	−0.98, −0.10
	In Person Therapy	Depression	20	88 %	1.04	0 %	−0.27	−0.40, −0.23
	Video Consultation	Depression	3	0 %			−0.54	−0.75, −0.32
	Online Tool	Anxiety	4	89 %			−0.77	−1.26, −0.28
	In Person Therapy	Anxiety	20	82 %	3.59	44.3 %	−0.48	−0.86, −0.10
	Video Consultation	Anxiety	3	0 %			−0.36	−0.58, −0.14
Transdiagnostic Outcome Measurement			7	0 %			−0.30	−0.40, −0.20

specialized care [69,70]. However, PC-based meta-analyses also showed comparable effect sizes but often focus either on specific treatment approaches, such as CBT or problem-solving therapy [71–76], or on specific delivery personnel, for example, by excluding GP-led interventions [77]. As the current meta-analysis aims to give a comprehensive overview by including different treatment approaches and delivery formats, the heterogeneity of studies might be responsible for slightly smaller effect sizes.

Concerning the treatment of somatoform disorders, transdiagnostic interventions did not lead to a significant symptom improvement. A recent Cochrane review focusing on the effects of psychosocial interventions delivered by GPs in primary care also found limited or conflicting evidence for the treatment of somatoform disorders [78]. This may be explained by the small number of trials included and the heterogeneity of the interventions [79].

In addition to the abovementioned analyses, subgroup analyses were performed to examine the effect of different treatment providers and intervention formats.

With regard to the treatment format, the included studies mostly used individual, face-to-face therapy, which is consistent with other studies and the preferences of PC patients [80–83]. In the current meta-analysis, larger effect sizes were found for the use of online tools compared to video consultations and in-person therapy, and also group therapy compared to individual treatment. Relatively small effect sizes, varying numbers of studies included in the subgroup analyses, small sample sizes, and high heterogeneity need to be considered. When interpreting this effect, three recent meta-analyses on transdiagnostic interventions for mental disorders in both primary and secondary settings support the results, confirming higher effect sizes for online therapy compared to in-person therapy [84–86]. This may be due to online treatment leading to greater patient compliance, as well as reducing barriers related to accessibility and stigma [87–89]. As online approaches, especially online tools, prove to be effective, future research needs to examine whether and which online interventions should be more often implemented as part of a stepped-care approach to bridge the time until specialized treatment for patients in need [90].

In terms of group therapy, the larger effect sizes found are in accordance with the results of a previous meta-analysis of transdiagnostic interventions for mental disorders in secondary care [91]. Results may be explained by the fact that patients benefit from the support and understanding of other participants while gaining alternative coping strategies through feedback from other participants [92]. Even though group formats have advantages for treatment facilitators, feasibility most likely varies due to space and billing options [93].

Regarding treatment administration, psychotherapists and psychologists were the primary providers in most studies. GPs were actively involved in the administration of interventions in only four studies; in all other studies, they had mainly a recruitment or referral role. The minority of studies used collaborative or integrated care approaches, integrating mental health experts into PC practices. When interpreting the results, the heterogeneity regarding the treatment provider, the variety of psychiatric training as well as the different interventions (i.e., psychotherapy) need to be taken into account. The subgroup analysis on the feasibility of interventions in PC showed that interventions provided by psychotherapists or psychologists are more effective than interventions administered by other health and medical professionals. This can be explained by their extensive training and by the length and duration of the interventions (80 min vs. 50 min; 8 vs. 5 sessions). However, interventions by health and medical professionals also proved to be effective, showing that transdiagnostic interventions can be feasibly implemented in PC. Future focus should be put on training GPs and other health and medical professionals so that integrative or collaborative care can help bridge the gap to more specialized care [94].

4.2. Strengths and limitations

While our review benefits from a diverse set of randomized controlled trials and our meta-analysis provides a comprehensive overview of a diverse set of transdiagnostic studies, limitations must be considered. Our search, confined to specific databases, may have missed relevant studies. Due to the ambiguous definition of the term "transdiagnostic" and inconsistent labeling of possibly transdiagnostic studies on the one hand, and the heterogeneity in the definition of "primary care" on the other hand, a wide range of studies was assessed and included, resulting in high heterogeneity and reduced comparability. The same is the case for the heterogeneity of treatment providers and interventions in the identified trials: from experienced professionals such as psychotherapists to less experienced administrators such as residents or students, the level of experience, as well as the format of the interventions, varied between studies. Self-report measures were utilized due to inconsistent clinician-rated instrument use, potentially inflating effect size estimates. Future studies should assess the effects of both clinician-rated and self-reported instruments. Lastly, in most of the studies, "treatment as usual" was used as a comparison. Therefore, it remains unclear whether the observed effects are due to specific elements of the transdiagnostic interventions or due to non-specific attention as studies often do not control for attention and time.

5. Conclusion

The findings of this systematic review and meta-analysis support the effectiveness of transdiagnostic interventions in alleviating depression and anxiety symptoms in PC. However, considerable heterogeneity between studies and the overall low quality of the included RCTs must be considered. The results of this meta-analysis show that transdiagnostic interventions administered by health and medical professionals not specifically trained in psychotherapy proved to be effective and can be feasibly implemented in PC. By focusing on common underlying processes across various mental health disorders, transdiagnostic treatment offers a more streamlined framework that can alleviate the aforementioned barriers presented by specific characteristics of PC, such as limited consultation times. Additionally, these approaches may enhance the ability of mental health professionals to address comorbid and subthreshold symptoms by providing a unified treatment strategy that is applicable to the nonspecific nature of mental health presentations often seen in PC. To accomplish this, more health professionals should be equipped with active training in the therapeutic management of common mental disorders through feasible transdiagnostic interventions to help bridge the treatment gap to more specialized care.

CRediT authorship contribution statement

Marie Vogel: Writing – review & editing, Writing – original draft, Formal analysis. **Christopher Ebert:** Writing – review & editing. **Jochen Gensichen:** Writing – review & editing, Supervision. **Hanna Applis:** Writing – review & editing, Data curation. **Alkomiet Hasan:** Writing – review & editing. **Kirsten Lochbühler:** Writing – review & editing, Supervision, Conceptualization.

Declaration of competing interest

Acknowledgements

Appendix A. Appendix

Appendix 1

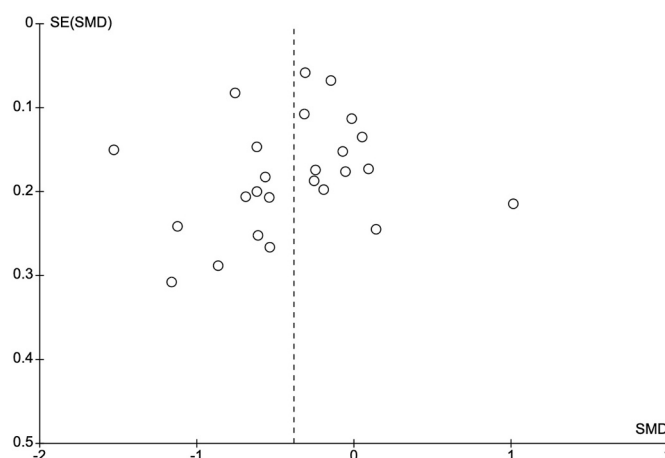Search strategy (exemplary for PubMed).

#	Searches	Results
1	(„primary health care"[tiab] OR "primary healthcare"[tiab] OR "primary care"[tiab] OR "primary medical care"[tiab] OR "ambulatory health care"[tiab] OR "ambulatory care"[tiab] OR "ambulatory health"[tiab] OR "ambulatory healthcare"[tiab] OR "outpatient*"[tiab] OR "general practice*"[tiab] OR "general practitioner*"[tiab] OR "family practice*"[tiab] OR "family practitioner*"[tiab] OR "general medical practice*"[tiab] OR "family medicine"[tiab] OR "general medicine"[tiab] OR "community health"[tiab] OR "community mental health"[tiab] OR "family doctor*"[tiab] OR "family physician*"[tiab] OR "primary care physician*"[tiab] OR "primary care doctor*"[tiab] OR "general physician*"[tiab] OR "general practice physician*"[tiab] OR "GP" [tiab] OR "resident doctor*"[tiab]) OR "Primary Health Care"[Mesh] OR "Physicians, Primary Care"[Mesh] OR "Outpatients"[Mesh] OR "General Practice"[Mesh] OR "General Practitioners"[Mesh] OR "Family Practice"[Mesh] OR "Community Health Services"[Mesh] OR "Physicians, Family"[Mesh] OR "Patient-Centered Care"[Mesh] OR "Ambulatory Care" [Mesh])	1.023.052
2	((„depress*"[tiab] AND „somat*"[tiab]) OR („anxi*"[tiab] AND „somat*"[tiab]) OR („anxi*"[tiab] AND „depress*"[tiab]) OR „mental disorder*"[tiab] OR „psychological disorder*"[tiab] OR („mental disorders"[Mesh] OR "depressive disorder"[MeSH] OR "depression"[MeSH] OR "Somatoform Disorders"[Mesh] OR "anxiety"[MeSH] OR "Emotional Regulation"[Mesh] OR "Psychopathology"[Mesh]))	1.676.870
3	1 AND 2	136.627
4	„Transdiagnostic*"[tiab] OR „Unified Protocol*"[tiab] OR „TCBT"[tiab] OR „T-CBT"[tiab] OR „third wave"[tiab] OR „Metacognitive Therap*"[tiab] OR „MCT"[tiab] OR "Acceptance and Commitment Therap*"[tiab] OR „ACT"[tiab] OR „Dialectical Behavior Therap*"[tiab] OR „Dialectical Behavior Therap*"[tiab] OR „DBT"[tiab] OR „mindfulness based therap*" [tiab] OR ("Psychotherapy, Brief"[Mesh] OR "Emotion Focused Therapy"[Mesh] OR "Psychoanalytic Therapy"[Mesh] OR "Cognitive Behavioral Therapy" [Mesh])	405.081
5	(1 AND 2) OR (1 AND 4)	148.704
6	exp randomized controlled trial AND clinical trial/	16.381
10	limit 10 to yr = „2009-Current"	8.995
11	limit 11 to english language AND german language	8.890

Appendix B. Funnel plot for publication bias.

Anxiety Outcomes:

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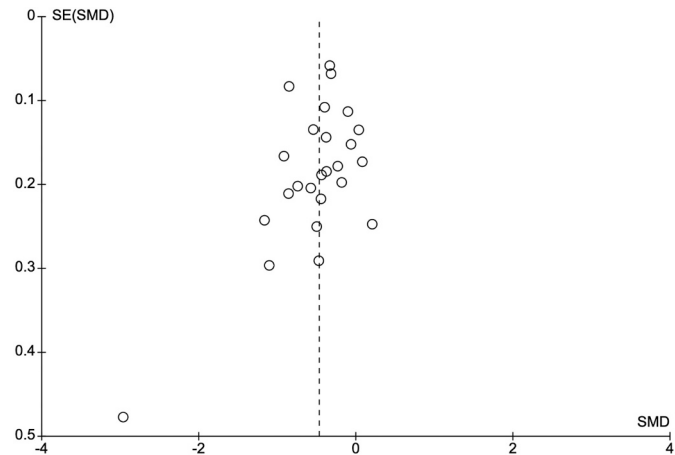
Depression Outcomes:

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Data availability

Data will be made available on request.

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