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Mapping specialized psychotherapy training for psychosis among mental health professionals in Switzerland: A social network analysis

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Abstract

Psychosis-specific psychotherapy is an evidence-based treatment approach that should be offered to patients during all phases of psychosis. However, to offer psychosis-specific psychotherapy, therapists need to engage in specialized training, which might not be part of their mandatory psychotherapy training. Hence, they may choose to attend the available individual psychosis-specific workshops, potentially resulting in a fragmented training landscape. Therefore, this study aimed to characterize the current training landscape in psychosis-specific psychotherapy. We conducted a large-scale survey among therapists (psychiatrists and clinical psychologists) in Switzerland. We retrospectively assessed self-reported attendance using a predefined list of psychosis-specific psychotherapy workshop types ($k = 15$), along with demographic variables. To visualize the current training landscape, we used descriptive and social network analyses. Of the participating therapists ($n = 1382$), 47% self-reported that they had attended at least one psychosis-specific psychotherapy workshop. The training landscape networks appeared fragmented (modularity scores ranging between 0.02 and 0.00). The three workshops with the highest self-reported attendance were cognitive behavioral therapy for psychosis (20%), psychotherapy for psychosis (17%), and psychosis-specific psychoeducation (16%). For combined attendance, no workshop combination exceeded a co-attendance rate of 10%. Furthermore, co-attendance patterns significantly differed across occupations and therapeutic orientations. This study identified gaps in the psychosis-specific psychotherapy training landscape, such as the diversity and fragmentation in training and low co-attendance rates. These findings offer a foundation for addressing potential gaps and providing evidence-informed measures to promote clearly defined, guideline-aligned specialization pathways.

Introduction

Current treatment guidelines recommend evidence-based psychotherapy as a key component in treating people with psychosis[1–5] (in this article, we used the term psychosis to refer to schizophrenia spectrum disorders). However, many people with psychosis, particularly in outpatient settings, do not receive psychotherapy and face substantial access barriers[3,6–8]. This knowledge-practice gap was observed in Switzerland[6,9] and other countries, including the UK[10,11], Italy[12,13], and the USA[7,14].

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Evidence from randomized-controlled trials[15–17] suggests that psychotherapy for psychosis is efficacious when delivered by therapists with psychosis-specific training and supervision. Thus, psychosis-specific qualifications beyond mandatory psychotherapy training are required to achieve comparable outcomes in routine care settings.

Psychosis-specific psychotherapy training benefits both the therapists and people with psychosis. Training increases the therapist's competence, specifically in psychotherapy for psychosis[18,19] and generally[20] and confidence in their ability to work with people with psychosis[21], offering treatment if their role and resources allow[18] and increasing the quality of the psychotherapy, as indicated by client positive feedback[18]. However, only a few studies investigated the impact of training on clinical outcomes[22,23].

Therapists often lack psychosis-specific training. Prior studies have largely focused on whether clinicians receive training during mandatory postgraduate psychotherapy programs required for federal licensure[21,24,25], with less attention paid to continuing education pathways. A study in the Netherlands estimated that within a 3-year period, cognitive behavioral therapy for psychosis (CBTp) was accessible for only 19.2–26.4% of patients with psychosis, and about one-third of these treatments were provided by psychologists untrained in CBTp, despite specializing in psychosis treatment[8]. Lack of training has been reported as a major barrier to the provision of evidence-based psychotherapy for people with psychosis, whereas enhancing qualifications was a potential facilitator of access[8,24–26].

In Switzerland, clinical psychologists and psychiatrists are the only professionals entitled to qualify in and provide psychotherapy by participating in mandatory postgraduate training; see[6,27] for a brief description. During mandatory postgraduate psychotherapy training, therapists may participate in psychosis-specific workshops. However, a German study indicated that most psychotherapists in training reported not receiving enough psychosis-specific training[24]. Additionally, workshop content remains unstandardized, depending on course focus and organizer preferences.

Therapists interested in psychosis-specific psychotherapy training may seek individual specialized workshops or extended courses offered by various institutions, clinics, or other stakeholders. This results in substantial variation in training opportunities and continuing education pathways.

In the United Kingdom, the "psychosis and bipolar pathway"[28] outlines a detailed framework of psychosis-specific psychotherapy competencies for specialist therapists to acquire. It includes numerous specific learning outcomes, including the ability to deliver targeted psychotherapeutic interventions for delusions, persecutory delusions, distressing voices and other hallucinations, negative symptoms, and cognitive disorganization. Advanced postgraduate programs based on this curriculum (e.g., postgraduate certificate in enhanced cognitive behavioral therapy: psychosis and bipolar[29]) provide therapists with coordinated and stepwise training, clinical practice, and supervision. Meanwhile, no such specialized programs were offered in Switzerland at the time of this study. Therefore, therapists are required to select from available trainings to qualify in psychosis-specific psychotherapy.

The extent of psychosis-specific psychotherapy qualifications among therapists remains unclear, as the mandatory postgraduate psychotherapy curricula usually cover content briefly, if at all[24,25]. Additionally, continuing education in psychotherapy is largely self-directed within broadly defined requirements, and clinicians are not required to attend training related to severe mental illnesses (e.g., psychosis)[30,31]. This lack of standardization and ambiguous training pathways may be associated with limited understanding of workforce-wide training patterns in psychosis-specific psychotherapy and significant disparities in therapist training profiles.

Given the low accessibility of psychotherapy for people with psychosis[6–8] and the importance of specialized training for delivering evidence-based psychotherapy, this largely unknown competence landscape complicates the monitoring and evaluation of treatment and qualification pathways. To develop recommendations for evidence-based training pathways and inform policy changes, understanding common self-curated patterns of workshop attendance and differences across occupations or therapeutic orientations is essential.

Switzerland is an example of a country without well-established training pathways for psychosis-specific psychotherapy. Therefore, we aimed (1) to describe attendance rates for psychosis-specific psychotherapy workshops in Switzerland and (2) to examine patterns of co-attendance across specialized psychotherapy workshops, (3) including differences by occupation (psychiatrists vs. clinical psychologists) and therapeutic orientation (e.g., a cognitive-behavioral vs. systemic orientation).

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Table 1 Descriptive characteristics of clinical psychologists and psychiatrists and their attendance in the specialized psychotherapy workshops on psychosis.

		Attendance in ≥1 specialized workshop		Attendance in the specialized psychotherapy workshops on psychosis															
	All	Yes	No	Psychotherapy	CBTp	PsychDyn	Systemic	EarlyInterv	FamEd	PsychoEd	CarerSupport	CogRemed	IPT	INT	MCTp	NegSym	Addiction-DD	PTSD-DD	Other
Variable	1382 (100%)	646 (46.74%)	736 (53.26%)	234 (16.93%)	277 (20.04%)	120 (8.68%)	116 (8.39%)	197 (14.25%)	90 (6.51%)	227 (16.43%)	133 (9.62%)	35 (2.53%)	83 (6.01%)	18 (1.30%)	62 (4.49%)	55 (3.98%)	62 (4.49%)	58 (4.20%)	38 (2.75%)
Gender																			
Male	372	183	189	67	78	46	39	47	27	66	41	14	25	5	13	19	24	14	9
Female	998	455	543	162	194	74	73	147	62	157	88	20	56	12	46	36	38	44	29
Diverse	5	4	1	2	2	0	1	2	0	3	1	0	0	0	2	0	0	0	0
No information	7	4	3	3	3	0	3	1	1	1	3	1	2	1	1	0	0	0	0
Age*	48 (20–96)	49 (26–96)	47 (20–83)	48 (26–78)	42 (28–72)	56.5 (29–80)	52 (29–78)	49 (26–77)	53.5 (28–77)	48.5 (26–80)	54 (29–80)	46 (26–63)	51 (26–96)	39.5 (28–96)	39 (26–66)	50 (26–72)	55 (31–74)	60 (30–80)	53 (26–71)
Occupation																			
Psychiatrist	335	166	169	62	58	44	36	61	27	66	45	9	23	3	17	14	20	11	10
Psychologist	1025	466	559	167	217	73	78	130	59	154	85	25	60	15	43	40	41	47	24
Both	3	3	0	1	1	1	1	1	1	1	1	0	0	0	1	0	0	0	0
Other	19	11	8	4	1	2	1	5	3	6	2	1	0	0	1	1	1	0	4
Therapeutic focus																			
Adults	1174	566	608	211	257	107	91	160	74	202	114	29	79	17	56	52	60	55	33
Youths/children	113	42	71	12	11	8	9	25	7	13	8	5	1	1	1	2	2	3	3
Other	43	20	23	5	4	2	12	9	7	6	7	0	2	0	3	0	0	0	0
NA	52	18	34	6	5	3	4	3	2	6	4	1	1	0	2	1	0	0	2
Therapeutic orientation (multiple choices possible)																			
Humanistic	173	67	106	38	16	13	12	20	10	27	20	4	9	1	3	7	6	17	3
CBT	574	302	272	103	266	7	28	78	31	122	47	20	52	14	47	33	24	16	14
Psychodynamic	284	148	136	55	15	90	17	49	22	46	34	4	13	3	4	11	22	18	36
Systemic	317	126	191	42	25	12	70	58	27	38	32	4	10	3	7	6	8	11	9
Body oriented	76	23	53	12	5	11	4	9	5	7	8	0	2	1	1	1	1	10	2
Other	93	46	47	22	15	3	10	10	6	12	12	4	6	3	5	3	7	8	5
Therapeutic orientation (categorized)																			
Humanistic	115	45	70	28	9	7	8	14	8	20	14	4	8	0	3	5	5	8	2
CBT	487	266	221	85	206	3	18	66	28	107	40	19	48	11	42	29	21	10	12
Psychodynamic	241	125	116	43	9	82	8	39	17	39	27	3	9	1	3	9	20	12	8
Systemic	224	82	142	23	13	4	51	41	19	22	21	3	5	1	3	3	5	3	6
Body oriented	42	12	30	5	2	7	0	6	2	2	5	0	1	0	1	0	0	5	1
Other	64	32	32	13	10	2	6	8	5	9	8	4	4	2	2	3	6	5	3
Multiple	157	66	91	31	23	12	21	20	9	22	14	1	7	3	6	5	5	15	4
NA	52	18	34	6	5	3	4	3	2	6	4	1	1	0	2	1	0	0	2
Insurance setting																			
Public care	1083	516	567	187	221	96	95	165	75	186	108	29	75	15	55	45	46	42	30
Private care	153	61	92	18	28	13	11	13	6	19	13	5	2	1	2	3	1	7	3
Both	102	51	51	25	19	9	7	11	6	15	10	1	5	2	4	5	10	8	3
Other	44	18	26	4	9	2	3	8	3	7	2	0	1	0	1	2	5	1	2
Occupational setting																			
Practice	854	399	455	155	153	90	76	118	65	136	93	19	46	9	19	35	37	49	21
Outpatient clinic	174	81	93	18	37	11	14	23	6	26	12	4	10	3	12	3	4	2	7
Day clinic	21	12	9	4	6	2	2	7	2	4	1	3	2	0	2	1	0	0	0
Inpatient clinic	175	73	102	26	40	7	11	20	6	28	9	5	11	3	15	9	8	3	4
Other clinic	14	7	7	4	6	0	1	1	0	5	2	0	3	1	0	1	1	0	2
Multiple settings	100	56	44	23	26	8	9	20	8	21	14	4	10	2	13	4	7	3	2

Table 1 continued

	All	Attendance in ≥1 specialized workshop		Attendance in the specialized psychotherapy workshops on psychosis														
		Yes	No	Psychotherapy	CBTp	PsychDyn	Systemic	EarlyInterv	FamEd	PsychoEd	CarerSupport	CogRemed	IPT	INT	MCTp	NegSym	Addiction-DD	PTSD-DD	Other
Only other	44	18	26	4	9	2	3	8	3	7	2	0	1	0	1	2	5	1	2
Number of patients treated per month*	27 (0–400)	30 (0–352)	25 (0–400)	26.5 (0–150)	30 (0–140)	30 (0–150)	35 (0–352)	30 (0–130)	33 (5–140)	30 (0–140)	30 (0–140)	30 (0–140)	30 (0–120)	25.5 (3–95)	20 (0–105)	30 (2–140)	30 (0–130)	30 (0–120)	28.5 (5–80)
Number of patients with F2 diagnosis, with psychotherapy focus*	0 (0–80)	1 (0–50)	0 (0–80)	1 (0–35)	1 (0–35)	1 (0–30)	1 (0–35)	1 (0–30)	2 (0–35)	1 (0–35)	1 (0–35)	1 (0–35)	1 (0–20)	1 (0–15)	1 (0–30)	1 (0–35)	1 (0–20)	2 (0–12)	1 (0–50)

Counts are reported for all variables. For variables highlighted with an asterisk (*), the median (min–max) is reported. F2-diagnosis refers to ICD-10 diagnoses of schizophrenia, schizotypal, and delusional disorders.

Psychotherapy psychotherapy for psychosis, *CBTp* cognitive behavioral therapy for psychosis, *PsychDyn* psychodynamic psychotherapy for psychosis; systemic, systemic psychotherapy for psychosis, *EarlyInterv* early diagnosis and intervention for psychosis, *FamEd* psychoeducative family intervention for psychosis, *PsychoEd* psychoeducation for psychosis, *CarerSupport* caregiver support for psychosis, *CogRemed* cognitive training/remediation for psychosis, *IPT* integrated psychological therapy program for psychosis, *INT* integrated neurocognitive therapy for psychosis, *MCTp* metacognitive training for psychosis, *NegSym* psychotherapy for negative symptoms, *Addiction-DD* psychotherapy for the dual diagnosis of psychosis and addiction, *PTSD-DD* psychotherapy for the dual diagnosis of psychosis and post-traumatic stress disorder, *Other* other.

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Table 2 Frequencies of combined attendance of specialized workshop pairs.

	Psychotherapy	CBTp	PsychDyn	Systemic	EarlyInterv	FamEd	PsychoEd	CarerSupport	CogRemed	IPT	INT	MCTp	NegSym	Addiction-DD	PTSD-DD	Other
Psychotherapy																
CBTp	90 (6.5%)	–														
PsychDyn	47 (3.4%)	13 (0.9%)	–													
Systemic	49 (3.5%)	29 (2.1%)	16 (1.2%)	–												
EarlyInterv	83 (6.0%)	79 (5.7%)	42 (3.0%)	42 (3.0%)	–											
FamEd	39 (2.8%)	36 (2.6%)	20 (1.4%)	37 (2.7%)	48 (3.5%)	–										
PsychoEd	92 (6.7%)	123 (8.9%)	40 (2.9%)	43 (3.1%)	100 (7.2%)	57 (4.1%)	–									
CarerSupport	57 (4.1%)	50 (3.6%)	33 (2.4%)	48 (3.5%)	65 (4.7%)	57 (4.1%)	81 (5.9%)	–								
CogRemed	12 (0.9%)	23 (1.7%)	4 (0.3%)	6 (0.4%)	20 (1.4%)	11 (0.8%)	26 (1.9%)	15 (1.1%)	–							
IPT	36 (2.6%)	45 (3.3%)	10 (0.7%)	17 (1.2%)	26 (1.9%)	20 (1.4%)	51 (3.7%)	29 (2.1%)	13 (0.9%)	–						
INT	7 (0.5%)	13 (0.9%)	2 (0.1%)	5 (0.4%)	6 (0.4%)	4 (0.3%)	13 (0.9%)	7 (0.5%)	7 (0.5%)	11 (0.8%)	–					
MCTp	25 (1.8%)	41 (3.0%)	3 (0.2%)	7 (0.5%)	25 (1.8%)	8 (0.6%)	38 (2.7%)	16 (1.2%)	11 (0.8%)	17 (1.2%)	5 (0.4%)	–				
NegSym	28 (2.0%)	36 (2.6%)	10 (0.7%)	10 (0.7%)	27 (2.0%)	14 (1.0%)	41 (3.0%)	21 (1.5%)	11 (0.8%)	15 (1.1%)	3 (0.2%)	11 (0.8%)	–			
Addiction-DD	34 (2.5%)	20 (1.4%)	17 (1.2%)	12 (0.9%)	26 (1.9%)	18 (1.3%)	35 (2.5%)	22 (1.6%)	3 (0.2%)	21 (1.5%)	2 (0.1%)	10 (0.7%)	14 (1.0%)	–		
PTSD-DD	29 (2.1%)	14 (1.0%)	18 (1.3%)	14 (1.0%)	19 (1.4%)	16 (1.2%)	27 (2.0%)	21 (1.5%)	1 (0.1%)	9 (0.7%)	0 (0.0%)	5 (0.4%)	7 (0.5%)	19 (1.4%)	–	
Other	6 (0.4%)	10 (0.7%)	3 (0.2%)	7 (0.5%)	6 (0.4%)	3 (0.2%)	9 (0.7%)	3 (0.2%)	0 (0.0%)	2 (0.1%)	0 (0.0%)	2 (0.1%)	0 (0.0%)	0 (0.0%)	4 (0.3%)	–

Percentage rates are computed in relation to all survey participants ($n = 1382$).

Abbreviations: *Psychotherapy* psychotherapy for psychosis, *CBTp* cognitive behavioral therapy for psychosis, *PsychDyn* psychodynamic psychotherapy for psychosis, *systemic* systemic psychotherapy for psychosis, *EarlyInterv* early diagnosis and intervention for psychosis, *FamEd* psychoeducative family intervention for psychosis, *PsychoEd* psychoeducation for psychosis, *CarerSupport* caregiver support for psychosis, *CogRemed* cognitive training/remediation for psychosis, *IPT* integrated psychological therapy program for psychosis, *INT* integrated neurocognitive therapy for psychosis, *MCTp* metacognitive training for psychosis, *NegSym* psychotherapy for negative symptoms, *Addiction-DD* psychotherapy for the dual diagnosis of psychosis and addiction, *PTSD-DD* psychotherapy for the dual diagnosis of psychosis and post-traumatic stress disorder, *Other* other.

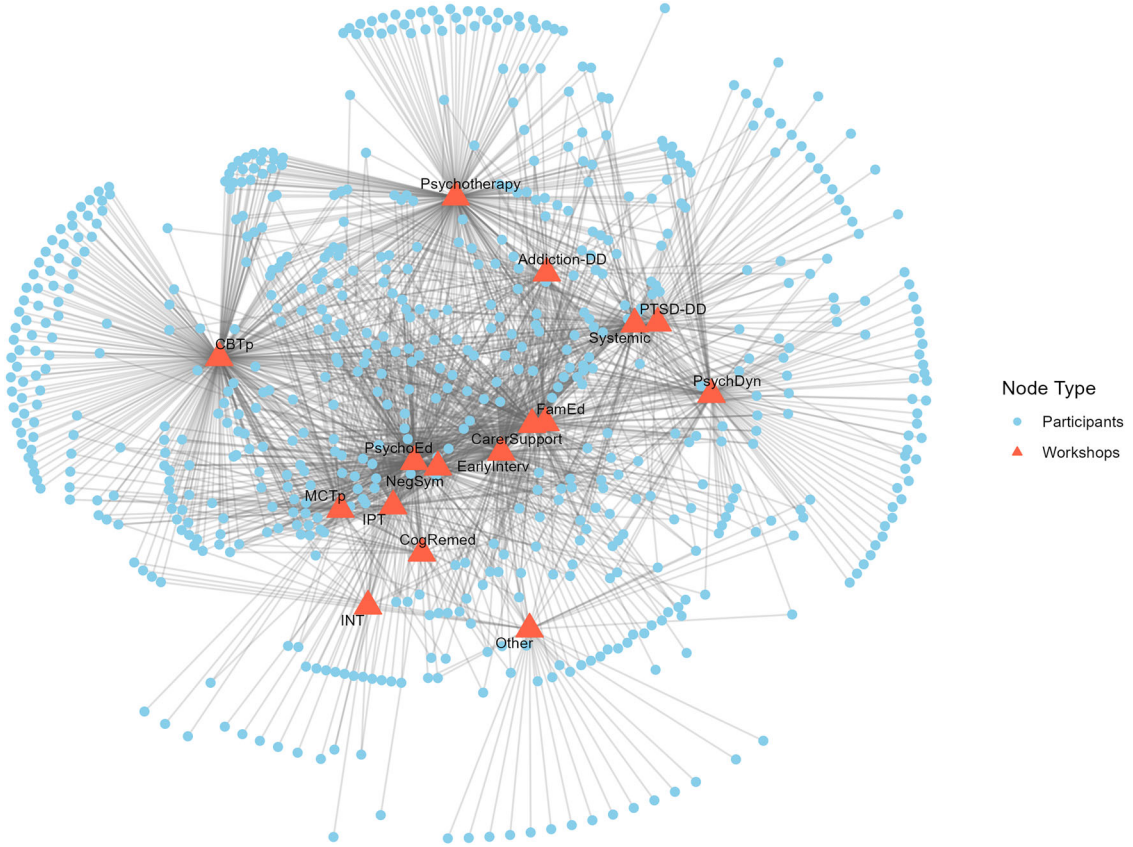


Fig. 1 Network visualization of attendance in the specialized psychotherapy workshops on psychosis, including both participants and workshops as nodes. *Abbreviations*: Psychotherapy psychotherapy for psychosis, CBTp cognitive behavioral therapy for psychosis, PsychDyn psychodynamic psychotherapy for psychosis, systemic systemic psychotherapy for psychosis, EarlyInterv early diagnosis and intervention for psychosis, FamEd psychoeducative family intervention for psychosis, PsychoEd psychoeducation for psychosis, CarerSupport caregiver support for psychosis, CogRemed cognitive training/remediation for psychosis, IPT integrated psychological therapy program for psychosis, INT integrated neurocognitive therapy for psychosis, MCTp metacognitive training for psychosis, NegSym psychotherapy for negative symptoms, Addiction-DD psychotherapy for the dual diagnosis of psychosis and addiction, PTSD-DD psychotherapy for the dual diagnosis of psychosis and post-traumatic stress disorder, Other other.

Results

Participants

A total of 1534 healthcare professionals initiated the survey and provided informed consent. Of these, 1382 (90%) completed the relevant survey section on attendance at psychosis-specific psychotherapy workshops and were included in the analyses. The final sample comprised 998 women, 372 men, 5 diverse individuals, and 7 participants who did not report their gender. Psychologists represented the majority of the sample ($n = 1025$, 74%; psychiatrists: $n = 335$, 24%). Of all included participants, 1083 (78%) worked in public care, 153 (11%) in private care, and 102 (7%) in both settings.

The participants reported a median caseload of 27 patients per month ($M = 32.34$, $SD = 26.75$). Regarding psychotherapeutic treatment of patients with schizophrenia, the reported median caseload was 0 ($M = 1.76$, $SD = 4.27$) but increased to 1 ($M = 2.34$, $SD = 4.36$) among participants who reported attending at least one specialized psychotherapy workshop on psychosis. To add more detail, 663 (48%) of participants indicated delivering psychotherapy for at least one person with psychosis per month. Further information is presented in Table 1.

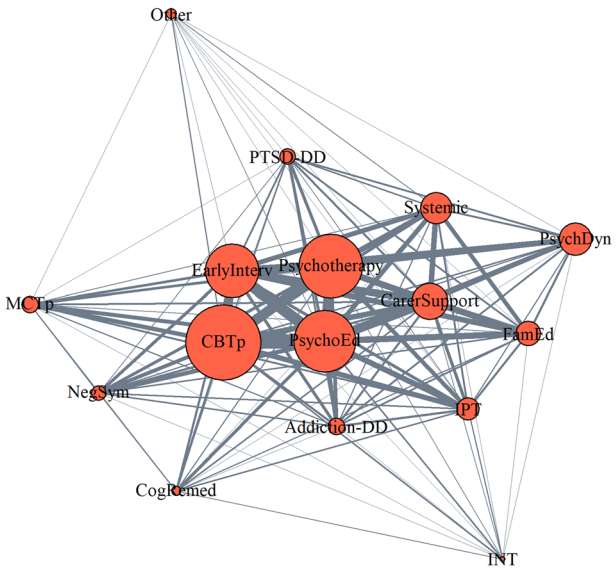


Fig. 2 Network visualization of attendance in the specialized psychotherapy workshops on psychosis, displaying workshops as nodes and co-attendance as edge strength. *Abbreviations*: Psychotherapy psychotherapy for psychosis, CBTp cognitive behavioral therapy for psychosis, PsychDyn psychodynamic psychotherapy for psychosis, systemic systemic psychotherapy for psychosis, EarlyInterv early diagnosis and intervention for psychosis, FamEd psychoeducative family intervention for psychosis, PsychoEd psychoeducation for psychosis, CarerSupport caregiver support for psychosis, CogRemed cognitive training/remediation for psychosis, IPT integrated psychological therapy program for psychosis, INT integrated neurocognitive therapy for psychosis, MCTp metacognitive training for psychosis, NegSym psychotherapy for negative symptoms, Addiction-DD psychotherapy for the dual diagnosis of psychosis and addiction, PTSD-DD psychotherapy for the dual diagnosis of psychosis and post-traumatic stress disorder, Other other.

Attendance of psychosis-specific psychotherapy workshops

Of the 1382 participants, 646 (46.74%) reported attending at least one specialized psychotherapy workshop on psychosis, 435 (31.48%) as part of mandatory postgraduate training in psychotherapy/psychiatry, 338 (24.46%) outside of mandatory postgraduate training, with an overlap of 127 (9.19%) participants who attended both within and outside of their mandatory training (Table 1). Regarding differences in occupation and orientation, 49.55% of psychiatrists and 45.46% of clinical psychologists reported attending at least one specialized workshop. Within each psychotherapeutic orientation (categorized), the proportion of participants reporting attendance in at least one specialized psychotherapy for psychosis workshop was 54.62% for CBT, 51.87% for psychodynamic orientation, 28.57% for body-oriented, 39.13% for humanistic, and 36.61% for systemic orientations.

Participants reported attending an average of 1.31 (SD = 1.94) specialized workshops on psychosis psychotherapy. Psychiatrists reported attendance in an average of 1.51 (SD = 2.08) and clinical psychologists in 1.23 (SD = 1.88) specialized workshops. When distinguishing between therapeutic orientations, participants with a CBT orientation reported attending an average of 1.53 (SD = 1.95) workshops, while the average attendance was 1.37 (SD = 1.94) in the psychodynamic, 0.88 (SD = 1.70) in the body-oriented, 1.24 (SD = 2.20) in the humanistic, and 1.00 (SD = 1.68) in the systemic orientations. On average, participants estimated spending a total of 2.76 ($SD = 6.41$) days in workshops on psychosis psychotherapy.

The three psychosis-specific psychotherapy workshops with the highest self-reported attendance rates were CBTp ($n = 277$, 20.04%), Psychotherapy ($n = 234$, 16.93%), and PsychoEd ($n = 227$, 16.43%). The three workshops with the lowest self-reported attendance rates were INT ($n = 18$, 1.30%), CogRemed ($n = 35$, 2.53%), and NegSym ($n = 55$, 3.98%). Table 1 provides further information on workshop attendance counts and participant characteristics.

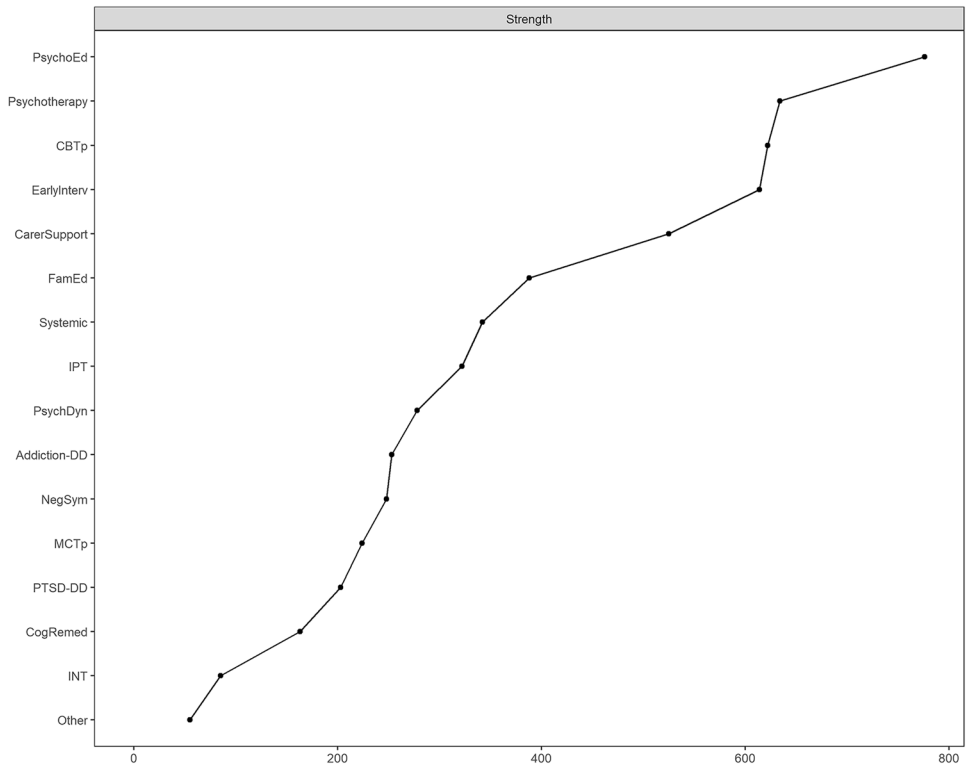


Fig. 3 Overview of strength values as a proxy for node centrality of the specialized psychotherapy workshops on psychosis. *Abbreviations*: Psychotherapy psychotherapy for psychosis, CBTp cognitive behavioral therapy for psychosis, PsychDyn psychodynamic psychotherapy for psychosis, systemic systemic psychotherapy for psychosis, EarlyInterv early diagnosis and intervention for psychosis, FamEd psychoeducative family intervention for psychosis, PsychoEd psychoeducation for psychosis, CarerSupport caregiver support for psychosis, CogRemed cognitive training/remediation for psychosis, IPT integrated psychological therapy program for psychosis, INT integrated neurocognitive therapy for psychosis, MCTp meta-cognitive training for psychosis, NegSym psychotherapy for negative symptoms, Addiction-DD psychotherapy for the dual diagnosis of psychosis and addiction, PTSD-DD psychotherapy for the dual diagnosis of psychosis and post-traumatic stress disorder, Other other.

Visualizing patterns in the specialized workshop attendance

Because participants could report attending multiple psychosis-specific psychotherapy workshops, we analyzed pairwise attendance frequencies, which reflected the number of participants who reported attending specific workshop combinations, such as PsychDyn and MCTp (Table 2). The three highest combined attendance rates were 123 participants (8.9%) for a workshop on CBTp and PsychoEd, 100 (7.2%) for a workshop on EarlyInterv and PsychoEd, and 92 (6.7%) for a workshop on Psychotherapy and PsychoEd. All three combinations included a workshop on psychoeducation. No workshop combination exceeded a co-attendance rate of 10% for all participants (Table 2).

Figure 1 visualizes the co-attendance networks with nodes as participants (blue circles) and workshops (red triangles). Edges indicate which participant attended which workshop. The network in Fig. 1 indicates that many participants only attended one specific workshop (many participants only have one edge).

Figure 2 summarizes the information by displaying workshops only. Here, the node size represents the number of participants attending the individual workshop, while the strength of the edges represents the frequency of combined attendance. However, edges appear more prominent (indicating more frequent co-attendance) between certain workshop topics, such as CBTp and PsychoEd. These topics were also attended by more people (as illustrated by node size) and often covered broader and introductory content on psychotherapy for psychosis.

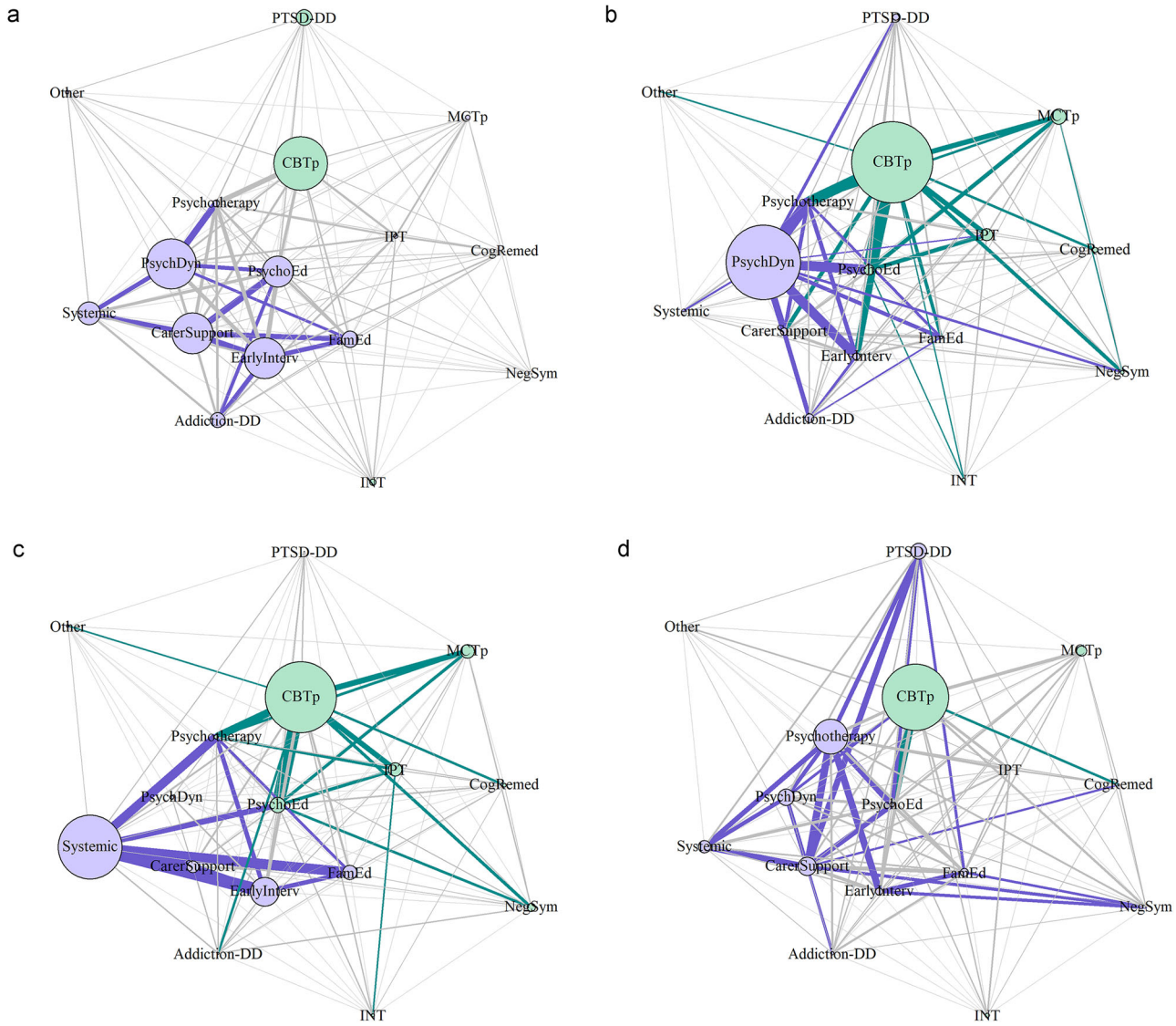


Fig. 4 Visualization of differences in co-attendance of the specialized workshops between **a** clinical psychologists and psychiatrists, **b** participants with a cognitive behavioral therapy (CBT) versus psychodynamic orientation, **c** participants with a CBT versus systemic orientation, **d** participants with a CBT versus humanistic orientation, with at least one psychosis-specific workshop. Node size illustrates the difference in relative attendance rates for the groups in focus (e.g., clinical psychologists vs. psychiatrists), with larger nodes indicating a larger difference. Node color indicates the direction of the difference, with green indicating a higher relative attendance among the first group mentioned (e.g., clinical psychologists) vs. the second group mentioned (e.g., psychiatrists), and purple indicates the opposite. Edge strength illustrates the difference in relative co-attendance numbers for the two groups, with thicker edges indicating a larger difference. Edge color further indicates that the difference between groups is significant at $\alpha = 0.05$ (vs. gray color, if the difference is not significant). Significant edges are in dark purple if co-attendance is higher for the second group (e.g., psychiatrists) vs. the first group (e.g., psychologists) and in dark green if attendance is higher for the first group (e.g., psychologists) vs. the second group (e.g., psychiatrists). Networks only include data from participants who belong to either group and who have attended at least one specialized workshop on psychotherapy for psychosis. *Abbreviations*: Psychotherapy psychotherapy for psychosis, CBTp cognitive behavioral therapy for psychosis, PsychDyn psychodynamic psychotherapy for psychosis, systemic systemic psychotherapy for psychosis, EarlyInterv early diagnosis and intervention for psychosis, FamEd psychoeducative family intervention for psychosis, PsychoEd psychoeducation for psychosis, CarerSupport caregiver support for psychosis, CogRemed cognitive training/remediation for psychosis, IPT integrated psychological therapy program for psychosis, INT integrated neurocognitive therapy for psychosis, MCTp metacognitive training for psychosis, NegSym psychotherapy for negative symptoms, Addiction-DD psychotherapy for the dual diagnosis of psychosis and addiction, PTSD-DD psychotherapy for the dual diagnosis of psychosis and post-traumatic stress disorder, Other other.

The three nodes (i.e., specialized workshops) with the highest strength/degree-centrality value in the network were PsychoEd, Psychotherapy, and CBTp (Fig. 3), indicating that pairwise co-attendance of psychosis-specific psychotherapy workshops most frequently included them.

Exploring workshop co-attendance networks for different occupations and therapeutic orientations

We also assessed different attendance patterns for specialized psychosis psychotherapy workshops by investigating potential clustering of nodes in the network. We used the Greedy, Louvain, and InfoMap algorithms to examine the community structure of the workshop co-attendance network and obtained modularity scores of 0.02, 0.02, and 0.00, respectively. These results indicate that the obtained communities were no better than a random distribution of edges, implying a lack of evidence for distinct and cohesive communities of workshops within the network of attendance in psychosis psychotherapy workshops.

To explore network differences for different occupations and therapeutic orientations, we visualized differences by displaying two-mode networks (i.e., participants and workshops as nodes), demonstrating the self-reported attendance for the specialized workshops (Supplementary Figs. S1 [occupation] and S2 [therapeutic orientation]). To emphasize differences in co-attendance among workshop-attending participants, we further created one-mode networks, with only workshops as nodes (Fig. 4a–d).

For the network investigating differences between psychiatrists and clinical psychologists (Fig. 4), we examined differences in relative workshop attendance (in relation to each subgroup that attended the workshops). The three largest differences were observed for PsychDyn, CarerSupport, and EarlyInterv, with more psychiatrists attending than psychologists. The three largest differences with more psychologists attending than psychiatrists were reported in CBTp, PTSD-DD, and INT. Edge weights for the difference in combined relative attendance for workshop pairs ranged from −0.07 to 0.05. These values can be multiplied by the factor 100 and interpreted as percentages reflecting the differences between the two groups, with values below 0 indicating a higher relative attendance among psychiatrists and values above 0 a higher relative attendance among psychologists. Therefore, the value of −0.07 reflects that the relative attendance rate for this workshop combination was 7% higher among psychiatrists compared with psychologists. Eleven edges significantly differed from chance level with a range of −0.07 to −0.03 (Fig. 4).

When comparing therapists of different therapeutic orientations (Fig. 4b–d), we used participants with a CBT orientation as the control group because it was the largest group in our study (Table 1). Figure 4b shows the differences between participants with a CBT orientation and those with a psychodynamic orientation. For differences in relative attendance in individual workshops, the three largest differences in attendance with more participants with a CBT versus a psychodynamic orientation were observed for CBTp, MCTp, and IPT workshops. The three largest differences with more participants with a psychodynamic versus CBT orientation were observed for PsychDyn, Addiction-DD, and CarerSupport workshops. Edge weights ranged from −0.22 to 0.29, and 32 edges were significantly different from chance level (weights ranging from −0.22 to 0.29). Given the direction of significant differences, 16 were negative and indicated a higher relative attendance among participants with a psychodynamic orientation. By contrast, 16 were positive, showing a higher relative attendance among participants with a CBT orientation.

Figure 4c presents the differences between participants with a CBT orientation and those with a systemic orientation. The three largest attendance differences with more participants with a CBT versus systemic orientation were observed for CBTp, PsychoEd, and MCTp workshops and with more participants with a systemic versus CBT orientation for systemic, EarlyInterv, and FamEd workshops. Edge weights ranged from −0.26 to 0.27, and 23 edges were significantly different from the chance level (weights ranged from −0.26 to 0.27). Nine of these significant differences were negative (indicating a higher relative attendance among participants with systemic orientation), whereas 14 were positive (showing a higher relative attendance among participants with a CBT orientation).

Figure 4d presents the differences between participants with a CBT orientation and those with a humanistic orientation. The three largest attendance differences with more participants with a CBT orientation versus those with a humanistic orientation were found for CBTp, MCTp, and INT workshops and with more participants with a

humanistic versus CBT orientation for Psychotherapy, CarerSupport, and PsychDyn workshops. Edge weights ranged from −0.16 to 0.19, and 22 edges were significantly different from chance level (weights ranged from −0.16 to 0.19). Regarding the direction of significant differences, 20 were negative, and 2 were positive, indicating a higher relative attendance among participants with a humanistic orientation compared with those with a CBT orientation.

Discussion

To the best of our knowledge, this study provides the most detailed characterization of the training landscape in psychosis-specific psychotherapy by applying social network analysis to an extensive dataset of therapists in Switzerland. The analyses provided insights into the distribution of psychosis-specific training qualifications among therapists in German-speaking Switzerland, identifying gaps and challenges.

Within our sample, 47% of participants reported attending at least one workshop, and 31% reported doing so during mandatory psychotherapy training. Thus, most participants did not attend any specialized psychotherapy workshops on psychosis. This aligns with other findings highlighting that psychotherapy for psychosis is treated as optional training and is not a standardized part of mandatory postgraduate psychotherapy training or the continuing education for mental health therapists[21,24,25,32].

Using social network analysis, we mapped co-attendance patterns in psychosis-specific psychotherapy workshops, and no workshop combination exceeded a co-attendance rate of 10% across all participants. Therefore, considering the workshops that were most attended, such as Psychotherapy or CBTp, only a small subset of therapists attended both. Furthermore, relatively few therapists reported attending specialized workshops, such as IPT, MCTp, Addiction-DD, PTSD-DD, and CogRemed. These workshops are on the periphery of the network, despite applying approaches recommended as best practices in psychosis-specific psychotherapy[4,5]. Overall, we observed substantial variation in the attendance and connectivity of evidence-based workshops, with the highest strength values for workshops such as PsychoEd, Psychotherapy, and CBTp, and the lowest values for INT, CogRemed, and PTSD-DD. These findings suggest limited self-reported training exposure among participants to certain guideline-recommended psychosis-specific psychotherapy interventions. While they do not allow conclusions about whether, or to what extent, these interventions are actually accessible to people with psychosis in routine care, they may point to a potential dissemination gap (for a viewpoint of a person with psychosis on what it may mean to receive talk therapy only instead of psychosis-specific psychotherapy, see[33]).

The absence of distinguishable training pathways was further reflected by investigating potential clustering of nodes in the network. Using different algorithms, we found no evidence for clusters of co-attendance in workshops, indicating a highly fragmented training landscape in psychosis-specific psychotherapy. Workshop participation patterns were diverse, with no distinct training pathways. This was further evident in network comparisons between occupations (psychiatrists versus clinical psychologists) and therapists with different orientations. Moreover, psychiatrists who attended at least one psychosis-specific workshop attended more psychosis-specific training and were more likely to attend certain combinations of workshops. This may be explained by the historical organization of mental health care in Switzerland and other countries, where mental health services for people with psychosis have been dominated by psychiatrists rather than psychologists[26,34]. Therefore, psychiatrists may be more likely to attend psychosis-specific psychotherapy training within their mandatory or continuing education. Overall, the diversified training profiles may indicate unequal access to evidence-based psychotherapy for people with psychosis, even if they undergo therapy.

Despite our insights into workshop attendance, no conclusions on the potential underlying mechanisms of (non) attendance were feasible. Beyond mandatory psychotherapy training, attendance may be linked to several factors, such as individual attitudes and interests, self-efficacy in working with people with psychosis, general therapeutic focus, and the extent to which therapists orient themselves toward evidence-based practice. Structural and institutional factors may also be associated, such as the availability and cost of workshops, workshop instructional strategies, and encouragement by institutions, employers, and other stakeholders, as well as integration into continuing education frameworks; for a broader overview, see[35–41]. Further research is required to understand the *why* behind the

individualized training pathways in psychosis-specific psychotherapy and how training pathways are linked to population-level service availability.

To the best of our knowledge, this study is the first to map patterns in psychosis-specific psychotherapy training among therapists using social network analyses, offering a detailed description of self-reported training backgrounds, combined with demographic variables. However, it had few limitations. We used retrospective self-reported data from German-speaking therapists in Switzerland, with possible selection bias (given the estimated response rate of 15% in the initial recruitment phase). Considering the estimated dissemination rates of psychotherapeutic orientations among therapists nationwide in Switzerland[42], participants with a cognitive-behavioral orientation are comparatively overrepresented in our sample. Moreover, relative to their distribution in the Swiss psychotherapeutic–psychiatric workforce[43], psychologists are overrepresented in our sample. Furthermore, study participation was not compensated, and the research topic was disclosed in the survey invitation. Hence, therapists might have been more likely to participate if they were interested in research generally and in psychosis treatment specifically, resulting in a sample with particular relevance for the psychotherapeutic care of people with psychosis. Workshop participation rates may have been overestimated, cf. volunteer selection bias[44]. Moreover, we only addressed one key dimension of psychosis-specific psychotherapy qualification: self-reported attendance in workshops. Other factors contributing to therapist qualification were unexamined[41], including clinical experience in working with people with psychosis[45–47], psychosis-specific supervision[47,48], and mentoring by clinically experienced, well-trained professionals[47,49]. Finally, we did not assess whether participants currently work or had previously worked in a psychosis-specific service (e.g., a specialized outpatient clinic).

Social network analyses facilitated visualization of the training landscape and co-attendance patterns. However, as network visualizations depend on the set of available nodes, the network would look different if we assessed attendance in different workshops on psychosis-psychotherapy (for example, by additionally asking for psychosis-specific social skills training or psychosis-specific acceptance and commitment therapy, both listed in the relevant S3 guideline). Nevertheless, we assume that our list of workshops was comprehensive, as the option "other" was selected occasionally, and the open-text box answers did not reveal other workshop options missed by multiple participants. Furthermore, some approaches, such as psychoeducation, were older than others, impacting the number of therapists with the opportunity to attend the training. Finally, network visualization only included participants who attended at least one specialized workshop on psychosis psychotherapy; therefore, it only relied on a subset of the sample.

Clinical implications

In Switzerland and countries with similar qualification structures, implementing clear, evidence-based training pathways recommended for different desired skill levels among therapists may reduce heterogeneity in the training landscape of psychosis-specific psychotherapy. Thus, from the patient's perspective, it may decrease the role of chance in determining which psychotherapeutic interventions they receive. Recommended skill levels of therapists may vary from a trained generalist role with a foundational background in psychosis-specific psychotherapy to a trained specialist[47].

Psychosis-specific psychotherapy training should be part of the mandatory psychotherapy qualification for all therapists, with specific content and learning objectives to be addressed in mandatory workshops. This would be crucial for psychotherapeutic training to better align with critical healthcare needs of the healthcare systems[34,50]. Stepwise, guideline-aligned curricula may specify which content should be addressed in a follow-up workshop during continuing education so therapists can qualify as trained generalists in psychosis-specific psychotherapy. Subsequently, further workshops could be recommended to deepen the acquired qualifications, including attending advanced postgraduate training programs in psychosis-specific psychotherapy[47,51,52].

Corresponding training pathways could be implemented and disseminated, and qualification elements, such as workshops, should be easily accessible for therapists. Our findings suggest that psychoeducation is a central workshop in the current training network; therefore, it could serve as a starting point to distribute information on additional training options and opportunities.

From a health policy perspective, the treatment gap could further be narrowed by offering financial support for interested therapists to build their qualifications in psychosis-specific psychotherapy (see, e.g., the Dutch National Healthcare Institution providing funding for CBTp training[8]). However, funding and access to specific training might not be sufficient to drive the dissemination of training and skill development. For example, MCTp developers offer free evidence-based course materials in many languages, affordable self-learning options, and substantial support on their website[53]. Nevertheless, workshop attendance, as depicted in our network data, was 4.5% of all included therapists. Further holistic approaches are required to increase therapists' motivation and resources to pursue individual training pathways in evidence-based psychosis-specific psychotherapy and to provide it for patients everywhere[38,39,41]. These approaches could include financial incentives in the tariff system for treating people with severe mental disorders, institutions' and stakeholders' strong commitment to continuous evidence-based education for therapists, and protected training time for skill development.

Conclusion

This study provides a detailed picture of the current training landscape in psychosis-specific psychotherapy by combining survey data from Switzerland with social network analysis. By modeling therapists' self-reported attendance in psychosis-specific psychotherapy workshops as a network, our findings show a fragmented training landscape with no evident distinct training pathways. Evidence-based training topics were partly located on the network periphery and rarely attended. Our findings offer a foundation for evidence-informed measures to promote clearly defined, guideline-aligned specialization pathways that qualify therapists as trained generalists or specialists in psychosis-specific psychotherapy to reduce the knowledge-practice gap.

Methods

Setting of the study

This was a large-scale, cross-sectional study using an online survey of clinical psychologists and psychiatrists in the German-speaking region of Switzerland between August 2022 and June 2023. The Ethics Committee Northwest and Central Switzerland (EKNZ) provided an ethics waiver for this study (EKNZ BASEC 2022-00279). All participants provided informed consent before participating in the study, and all procedures were performed in accordance with the Declaration of Helsinki's latest revision[54].

Mental health system in Switzerland

Switzerland is a high-income country with a well-developed health care system for providing psychiatric and psychotherapeutic care to people in need. The system is characterized by a high density of licensed psychiatrists and clinical psychologists and substantial treatment capacities[55,56], which, however, vary across the different cantons[57]. Psychiatric and psychotherapeutic care is available to people across a broad spectrum of services, including inpatient clinics, day clinics, outreach services, institutional outpatient clinics, and a substantial private outpatient practice sector, including individual and group practices operating independently of hospitals and other institutions[55]. Larger Swiss cities often also provide psychosis-specific outpatient services affiliated with major hospitals, where psychologists and psychiatrists typically work together in interdisciplinary teams (for example, the university hospitals in Basel, Bern, or Zurich).

According to the Swiss National Health Report 2025[43], the psychotherapeutic–psychiatric workforce in Switzerland in 2023 comprised an estimated 4991 full-time equivalents (FTEs) of psychologists across inpatient and intermediate-care settings and outpatient services reimbursed by mandatory health insurance. In the same settings, the

corresponding physician workforce estimate was 6457 FTEs (FTE ratio between the professional groups 1:1.29). These estimates do not include the workforce in the outpatient sector that bills private health insurance companies or self-paying patients. Thus, the total psychiatric and psychotherapeutic workforce in Switzerland is likely to be substantially larger[43].

In Switzerland, federal licensure to practice psychotherapy requires mandatory postgraduate training in a recognized psychotherapeutic orientation, although postgraduate training pathways vary between psychiatrists and clinical psychologists. A 2012 survey investigated the dissemination of mandatory postgraduate training in psychotherapy of 1150 clinicians nationwide in Switzerland and reported 32% of participants underwent a psychodynamic/psychoanalytic training, 19% underwent a cognitive-behavioral training, 17% underwent a humanistic training, and 12% underwent systemic training[42].

Regarding the continuing education of therapists, licensed psychiatrists in Switzerland are required to complete 80 hours of continuing education per year. This comprises 50 h of documented structured continuing education and 30 h of self-study. Of the 50 documented hours, at least 25 must be spent on subject-specific education in psychiatry and psychotherapy, while up to 25 credits may be earned through interdisciplinary topics[30]. Licensed psychologists (with a completed mandatory postgraduate training in psychotherapy) are obliged to deepen, broaden, and improve their psychotherapeutic skills by participating in continuous education throughout their entire professional career. At this federal level, there are no specifications on the number of hours of training required. However, the largest professional association of Swiss psychologists, the Swiss Federation of Psychologists (FSP), requires licensed psychologists to complete 240 h of continuing education over each 3-year period. Eligible continuing education activities include, for example, participation in advanced training courses, workshops, conferences, supervision, and self-study[31]. For both professional groups, continuing education requirements do not specify diagnostic areas to be covered. Thus, continuing education may be linked to therapists' interests and training availability. Attending psychotherapy training for severe mental illnesses (e.g., psychosis) remains optional rather than systematically embedded in postgraduate or continuing education pathways.

Therapists are not legally obliged to follow the relevant clinical treatment guidelines. This applies to the Swiss SGPP treatment recommendations[58] and current international guidelines, such as the NICE[1], APA[3], or S3[2,5] guidelines. However, there are legally binding professional obligations that require psychiatrists and clinical psychologists to adhere to the competencies they acquired through mandatory postgraduate training and continuing education, thus requiring them to consider principles and methods of scientific research in the field. Hence, while clinicians draw on the Swiss and international guidelines, real-world adherence is largely unknown.

Participants and design

We invited psychologists and psychiatrists to participate in the study. Participants were eligible if they worked in the mental health care system, either during or after completing mandatory postgraduate training in psychotherapy or psychiatry. We informed participants that the survey focused on the psychotherapeutic treatment of people with schizophrenia in Switzerland. However, working with people with schizophrenia was not required, which was stated in the invitation message. All clinical psychologists and psychiatrists were therefore eligible to participate to foster a representative sample with regard to general clinical practice in which clinicians' treatment of people with psychosis might vary over time.

In the first phase of recruitment, we distributed the study via an email list of an association of psychotherapists (FSP, see https://www.psychologie.ch/de) as well as to therapists working in the private outpatient practice sector. Here, we obtained 3238 distinct email addresses. We forwarded the invitation plus a reminder to these addresses and observed a response rate of 18% for initial participation in the study and 15% for formal completion of all survey questions.

In subsequent recruitment phases, the invitation email containing the survey link was distributed via professional associations and institutions, and additionally sent to clinical psychologists and psychiatrists in private outpatient

practice whose email addresses were publicly available in professional directories. As the number of clinicians reached in this phase is unknown, an overall response rate cannot be reported.

Participant anonymity was guaranteed, and participation time was estimated to be 15 min for the entire survey. We provided a raffle of vouchers (10 × 100 CHF) as a thank-you for the participants' time and effort.

Materials and procedure

The survey included several sections on self-reported characteristics, training levels in psychotherapy for psychosis, knowledge of treatment guidelines, and perceived competence in delivering psychotherapy for people with psychosis. We described only the variables relevant to the manuscript and used them in the present analyses.

Descriptive information

Participants provided the following information: gender (male, female, diverse, or no information), age, occupation (psychiatrists and/or clinical psychologists with training, such as completed master's degree, currently in or having completed mandatory postgraduate training in psychotherapy or psychiatry; multiple choices), therapeutic focus (adults, youths/children, other; single choice), and their therapeutic orientation (first mandatory psychotherapy training; humanistic, cognitive behavioral, psychodynamic or analytical, systemic, body-oriented, other; multiple choices). We recoded therapeutic orientation into categories, classified analytic and psychodynamic focuses into a *psychodynamic* category, and created a new *multiple* category for all participants who indicated more than one therapeutic orientation.

Insurance and occupational settings

We assessed the participants' primary work situation with a multiple-choice item and recoded the responses into two variables: insurance (standard care, private care/self-paid, both, other) and primary occupational (practice, outpatient clinic, day clinic, inpatient clinic, other clinic, multiple settings, other) settings.

Caseload

Participants estimated their monthly caseload, overall and specifically for schizophrenia (as a proxy for psychosis-related caseload). As psychiatrists in Switzerland can provide pharmacological and psychotherapeutic treatment, while clinical psychologists provide psychotherapy exclusively, we asked psychiatrists to additionally estimate their monthly psychotherapeutic caseload for patients with schizophrenia. We used the estimates from the latter question for psychiatrists and from the former question for clinical psychologists to recode a variable indicating how many patients with schizophrenia were treated monthly using psychotherapy.

Attendance of psychosis-specific psychotherapy workshops

In the original German survey, workshop titles were labeled with the expression "for schizophrenia spectrum disorders" (Schizophreniespektrumstörungen) based on the DSM-5 terminology[59] that is widely used in the German-speaking health sector. However, for common English-language and patient-centered language usage, we used the term "psychosis" in this manuscript[60,61].

We informed participants about the advanced postgraduate training curricula for psychotherapy for psychosis and provided examples (e.g., the curricular advanced training in psychosis psychotherapy with a psychodynamic focus, duration approx. 11 days, hosted by the confederation for the psychotherapy of psychosis in German-speaking countries[52] or the postgraduate certificate in enhanced cognitive behavioral therapy with a focus on psychosis and bipolar[29]). We also outlined the availability of shorter training courses and workshops, conveying the foundations or

specific approaches and techniques of psychotherapy for psychosis. We asked participants about their attendance at a short psychosis-specific workshop or training and to describe the context (within the mandatory postgraduate psychotherapy training, outside of the mandatory postgraduate psychotherapy training, no attendance; multiple choices).

Participants who reported attending short workshops or training (e.g., a 1-day course) were presented with a predefined list of 15 specialized workshop types focusing on the psychotherapy of psychosis. The list was based on a pragmatic literature search to identify psychosis-specific workshops for the survey. Psychosis-specific workshop topics were either linked to established psychotherapeutic approaches and included in psychosis-specific treatment guidelines[1, 2, 5] or represented procedure- or syndrome-specific interventions for people with psychosis, such as psychosis-specific psychoeducation or psychotherapy for co-occurring post-traumatic stress disorder. These latter topics were selected because they are listed in psychosis-specific treatment guidelines relevant to Switzerland. The resulting survey list included the following workshops, for which the abbreviated labels (presented in brackets) are used throughout the manuscript: psychotherapy for psychosis (Psychotherapy), cognitive behavioral therapy for psychosis (CBTp)[62,63], psychodynamic psychotherapy for psychosis (PsychDyn)[64,65], systemic psychotherapy for psychosis (Systemic)[66], early diagnosis and intervention for psychosis (EarlyInterv)[67,68], psychoeducation for psychosis (PsychoEd)[69], psychoeducative family intervention for psychosis (FamEd)[70], caregiver support for psychosis (CarerSupport)[71], cognitive training/remediation for psychosis (CogRemed)[72], integrated psychological therapy program for psychosis (IPT)[73], integrated neurocognitive therapy for psychosis (INT, not specifically mentioned in the guidelines, but developed in Switzerland and falling under the broader guideline-recommended category of cognitive remediation)[74], metacognitive training for psychosis (MCTp)[75], psychotherapy for negative symptoms (NegSym)[76,77], psychotherapy for the dual diagnosis of psychosis and addiction (Addiction-DD)[78], psychotherapy for the dual diagnosis of psychosis and post-traumatic stress disorder (PTSD-DD)[79], and other (Other).

Participants were instructed to select the workshops they had attended from this list. The option "other" provided an open text box for describing additional psychotherapy workshops on psychosis that participants had attended but were not specifically listed. Participants then estimated how many days in total they had spent in specialized workshops or training courses for psychosis psychotherapy.

Statistical analyses and code availability

All analyses were performed using RStudio version 4.3.3[80]. The R code can be made available to interested researchers upon request.

Attendance at specialized psychotherapy workshops on psychosis

To analyze the dissemination of psychosis-specific psychotherapy workshops among psychologists and psychiatrists, we computed descriptive statistics including frequencies, means, standard deviations, and medians. We also investigated interdependencies in workshop attendance by computing frequencies for pairwise attendance. These analyses were conducted for all participants included in this study.

Visualizing patterns in the co-attendance in specialized workshops

To understand the workshop landscape, we visualized the data as networks using the packages igraph[81] and ggraph[82]. Networks consist of nodes and edges (or ties) that connect these nodes. To compute networks, we used the dataset with all participants who reported attendance in at least one psychosis-specific psychotherapy workshop.

In one type of visualization, we considered both participants and workshops as nodes (i.e., a two-mode network), with an edge connecting a participant to a workshop node if the participant reported attending that specific workshop (Fig. 1). In another visualization, we aggregated the information to the workshop level, displaying only workshops as nodes (Fig. 2). In this case, the weighted edges represent the number of participants who attended both workshops

connected by the edge (i.e., co-attendance). Additionally, the node size for workshops illustrates the number of participants who reported attending a specific workshop type.

Exploring workshop co-attendance networks for different occupations and therapeutic orientations

To quantify co-attendance between workshops in a network, we computed strength as a degree-centrality measure for the network nodes[83,84], which is defined as the sum of all edge weights a node is connected to[84]. This measure represents how many participants attended a particular workshop while also having attended any of the other workshops. To investigate patterns of co-attendance within a network, we examined the clustering within the network, that is, whether groups of workshops were more likely to be attended together. For this clustering analysis, we computed modularity scores using different algorithms[85]. Network modularity measures the degree to which a network can be partitioned into distinct communities, characterized by dense intra-community connections and sparse inter-community connections[86]. The modularity score theoretically ranges from −1 to 1, with higher values indicating a stronger community structure. A score close to 0 suggests that the detected community structure is comparable to a random distribution of edges, implying a lack of community structure (i.e., not more ties within clusters than between clusters). We used community detection algorithms for weighted networks[85], such as the Greedy[87], Louvain[88], and InfoMap[89] algorithms.

To investigate differences in networks for different occupations, namely clinical psychologists versus psychiatrists, we visualized differences by creating two-mode networks showing individuals and workshops in the same figure. Subsequently, we tested whether differences between groups in workshop co-attendance significantly differed from chance level. Specifically, we calculated the proportion of co-attendance for each pair of workshops separately for psychologists and psychiatrists; then we computed a difference matrix reflecting how much more (or less) frequently psychologists co-attended each workshop pair compared with psychiatrists. To assess the statistical significance of these differences, we conducted permutation tests[90], generating 10,000 reshuffled networks in which occupation labels were randomly reassigned while preserving the observed network structure. Using a two-sided permutation test, results were significant if $|t_{obs}|$ exceeded the 95th percentile of the permuted $|t_{perm}|$ distribution (i.e., $\alpha = 0.05$). The results were then used to create a workshop-based network in which edges are displayed in color for occupation-based differences that are significantly different from chance level. We repeated this procedure for different therapeutic orientations and focused on the four largest groups. We then compared therapists with a CBT orientation to therapists with a psychodynamic orientation, therapists with a systemic orientation, and therapists with a humanistic orientation.

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Author contributions J.M., M.E.J., and L.H. designed the study. L.H. and J.M. collected the data. M.E.J. and T.E. performed the statistical analysis. J.M., R.L., U.L., and C.G.H. aided in interpreting the results. M.E.J. and J.M. wrote the first draft of the paper, and T.E., R.L., U.L., and C.G.H. revised the manuscript for important intellectual content.

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Data availability The data is not publicly available, but an anonymized version of the variables presented here can be shared upon request.

Competing interests J.M. and C.G.H. are co-founders and co-heads of the newly established advanced postgraduate training program in psychotherapy for psychosis in Switzerland ("CAS-PSP Psychotherapie bei Psychosen"). J.M. and M.E.J. provide

workshops on psychosis-specific psychotherapy at various psychotherapy institutes and other institutions. The authors declare that they have no other conflicts of interest.

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