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Research report

Which depressive symptoms remain after response to cognitive therapy of depression and predict relapse and recurrence?

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ABSTRACT

Background: Major Depressive Disorder (MDD) is highly prevalent, severely debilitating, and often recurrent. Greater residual depressive symptoms after acute phase treatment predict greater relapse and recurrence. It is unknown, however, which *specific* depressive symptoms remain and are most predictive.

Method: The current study examined (a) which *specific* residual symptoms remained after effective treatment with acute phase cognitive therapy (A-CT) for recurrent depression and (b) if any of those *specific* residual symptoms were risk factors for relapse and recurrence over a 2-year follow-up.

Results: After completing 20 sessions of A-CT, a substantial proportion of adult responders continued to endorse somatic anxiety (42%), psychological anxiety (37%), middle insomnia (36%), depressed mood (29%), loss of libido (29%), late insomnia (24%), anergia (21%), guilt feelings (18%), early insomnia (17%), and anhedonia (14%), as defined by the 17-item Hamilton Rating Scale for Depression (HRSD). Decreased agitation, increased psychological anxiety, increased loss of appetite, increased loss of libido, and increased hypochondriasis were all risk factors for relapse and recurrence over a 2-year follow-up (all $p<.05$), after stratifying on number of previous episodes and controlling for age at onset and whether A-CT responders received continuation phase CT instead of assessment only control.

Limitations: These findings are based on a limited sample size ($n=84$), which was modestly restricted in terms of gender, ethnicity, region, and mean education level.

Conclusions: These results confirm that residual symptoms are common after A-CT. We hypothesize that treatments, intervention modules, or durations that effect and/or target *specific* residual symptoms may further reduce depression relapse and recurrence.

1. Introduction

Major Depressive Disorder (MDD) is a highly prevalent, severely debilitating, and often recurrent disease (Kessler et al., 1994, 2001; Lopez and Murray, 1998; Zis and Goodwin, 1979). The field continues to explore which variables are predictive of relapse and recurrence. The most commonly reported risk factors for relapse and recurrence are residual symptoms, number of previous episodes, and severity of depression at intake (Table 1). Here we reason that identifying the *specific* residual symptoms which both (a) remained after response to acute phase cognitive therapy (A-CT) *and* (b) predicted increased relapse and recurrence over 2 years follow-up may contribute to improving long-range outcomes in this recurrent disease, particularly in those patients who prefer psychotherapy (i.e., cognitive therapy) over pharmacotherapy for recurrent depression.

Previous studies examining residual symptoms as predictors of relapse and recurrence generally used a "*global*"

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Table 1
Select previous studies examining risk factors for increased depression relapse and recurrence.

Study	Sample	Age (M)	Female	*N*	Acute treatment	Predictors of relapse
Treatment: antidepressant medication only						
Faravelli et al. (1986)	IP	53–55	57%	101	AD	↑ Residual symptoms, ↓ social adaptation, ↑ pathological personality profile, and ↓ tricyclic plasma levels
Georgotas and McCue (1989)	OP	>55	54%	41	AD	↑ # of prior episodes
Judd et al. (1998)	IP + OP	40	62%	237	AD	↑ Residual symptoms
Judd et al. (2000)	IP + OP	N/A	N/A	122	AD	↑ Residual symptoms
Lin et al. (1998)	OP	48	77%	251	AD	↑ Residual symptoms, ≥2 prior episodes or dysthymia
Mueller et al. (1996)	OP	38–40	51–64%	380	AD	Female, length of episode, ↑ # of prior episodes, never married
Paykel et al. (1995)	IP + OP	43	61%	70	AD	↑ Residual symptoms
Pintor et al. (2003)	OP	51	65%	356	AD	↑ Residual symptoms
Pintor et al. (2004)	OP	51	65%	356	AD	↑ Residual symptoms, ↑ baseline depression severity; ↓ age; ↑ # of prior episodes
Ramana et al. (1995)	IP + OP	20–65	61%	70	AD	↑ Baseline depression and anxiety severity, ↑ # of prior episodes (trend)
Surtees and Barkley (1994)	IP + OP	47	63%	80	AD	>45 years old, ↑ # of prior episodes, ↓ parasuicidal behavior
Treatment: cognitive–behavioral therapy only						
Teasdale et al. (2001)	OP	43–44	49%	158	CBT	↑ Residual symptoms, ↑ extreme or dichotomous thinking style
Thase et al. (1992)	OP	37	70%	48	CBT	Slower response to therapy, unmarried, ↑ dysfunctional attitudes
Treatment: other						
Hooley and Teasdale (1989)	IP	48	59%	39	AD, ECT	↑ Expressed emotion, marital distress, perceived criticism
Simons et al. (1986)	OP	N/A	N/A	70	CBT, AD	↑ Residual symptoms, ↑ dysfunctional attitudes, did not receive CBT
Van Londen et al. (1998)	IP + OP	45	59%	56	AD, THPY	Residual symptoms, ≥1 prior episode, psychoticism
Winokur et al. (1993)	IP	31–46	N/A	172	Varied	↑ # of prior episodes, female, ↓ age at onset
O'Leary et al. (2000)	IP	41	57%	100	Varied	HRSD > 20 on admission

Note. OP = outpatient; IP = inpatient; AD = antidepressant medication; ECT = electroconvulsive therapy; Varied = patients did not receive any specific therapy, but may have received various types psychotherapy along with antidepressant medication; CBT = cognitive–behavioral therapy; PBO = placebo; THPY = various types of psychotherapy; sx = symptom; tx = treatment; Residual symptoms = definitions are inconsistent across studies, (e.g., a continuous measure on a depression inventory to arbitrarily dichotomizing scores on those inventories); reference studies for specifics.

definition that varied between studies, but was typically defined by a score of 8 or more on the 17-item Hamilton Rating Scale for Depression (HRSD-17: Hamilton, 1960; Tranter et al., 2002). Using this definition, the prevalence rates of residual symptoms range from 30%–54% whether patients receive pharmacotherapy or psychotherapy (Nierenberg et al., 1999; Paykel et al., 1995; Tranter et al., 2002).

No studies have reported *specific* residual symptom prevalence rates or examined these symptoms as risk factors for relapse and recurrence following effective treatment for depression with cognitive therapy (CT) of depression. Paykel et al. (1995) did report prevalence rates of residual symptoms following treatment with antidepressant medication in inpatients and outpatients, and found that when patients remitted from MDD, they continued to report all depression symptoms except loss of insight. Further, those patients with more residual symptoms (i.e., HRSD > 8) were more likely to relapse (76% vs. 25%). Nierenberg et al. (1999) found that 82.4% of patients who responded (HRSD < 8) to acute phase fluoxetine treatment continued to report at least one residual symptom. Nierenberg et al. did not, however, detail the prevalence of specific residual symptoms, indicating only that the most commonly reported residual symptoms were sleep disturbance, fatigue, and diminished interest or pleasure. A more recent study by Dombrovski et al. (2008) has more closely approximated evaluating *specific* residual symptoms as risk factors for relapse or recurrence, using *subscales* and total scores of the HRSD, along with total scores from a specific measure of sleep quality. Using this multi-method approach, they found that high scores on the insomnia subscale and a measure of sleep quality predicted depression recurrence, despite maintenance interpersonal therapy. While important information, this research still fails to answer the question of which *specific* symptoms as measured by the HRSD are most predictive of relapse and recurrence.

The primary aim of the current project was to take previous findings a step further by answering the following questions: (a) Which specific depressive symptoms remain after response to 20 sessions of A-CT (defined below)? (b) Which residual depressive symptoms are predictive of depressive relapse and recurrence over the course of 2 years follow-up, after controlling for age at onset, and whether patients received continuation cognitive therapy (condition)? Statistical controls were used for age at onset and condition because Jarrett et al. (2001) reported that these factors moderate relapse and recurrence. Although "stability of remission" was also a significant predictor in Jarrett et al. (2001), the current analyses did not control for stability of remission because it was defined by combining HRSD symptoms, and *individual symptoms* were the primary interest in the current analysis.

2. Methods

2.1. Patients

These analyses involved the 84 patients with recurrent MDD who responded (defined below) to 20 sessions of A-CT and then consented to be randomly assigned to either continuation phase CT (C-CT) or evaluation only (control) in an 8-month experimental phase, with follow-up assessments over the next

16 months, for a total of 24 months post-A-CT (Jarrett et al., 2001). Demographic information on the responder sample was: age range 24–64 years ($M = 42.7$, $SD = 15.4$), female (73%), unemployed (29%), ethnicity (Caucasian = 90%, African American = 4%, Hispanic = 4%, other = 2%), and marital status (married or cohabitating = 57.1%, divorced, separated, or widowed = 27.4%, single = 15.5%).

2.2. Measures

2.2.1. The 17-item Hamilton Rating Scale for Depression (HRSD; Hamilton, 1960)

The HRSD is the measure most often used to define "residual" symptoms in the literature, and is likely the most widely used clinician-rated scale for measuring depression in research. The HRSD assesses depressed mood, vegetative and cognitive symptoms of depression, and comorbid anxiety symptoms. Items are rated on either a 5-point (0–4) or a 3-point (0–2) scale, and the total score is derived by summing the individual item scores. The HRSD has an inter-rater reliability of .90 (Hamilton, 1960). The discriminant validity of the HRSD is supported by multiple studies showing significant differences in HRSD scores between depressed and euthymic persons (Basco et al., 1997). To avoid potential biases in defining response by treating therapists, HRSD scores used in this trial were assessed by a trained independent rater at the first evaluation post-A-CT.

2.2.2. Longitudinal Interval Follow-up Evaluation (LIFE: Keller et al., 1987)

The primary dependent variable for the current study was relapse and recurrence rates as determined by an evaluator, blind to treatment condition, using the LIFE Psychiatric Rating Scale (PSR) ratings of depressive symptoms. Blind evaluations (BEV) occurred at: (1) the end of A-CT; (2) anytime the patient, therapist, or follow-up evaluators suspected relapse or recurrence; (3) early exit; (4) months 4 and 8 of the experimental phase; and (5) months 12 and 24 of follow-up. The following definitions were used to conceptualize and define change points in the course of unipolar MDD (Frank et al., 1991).

- *Response:* absence of DSM-IV (American Psychiatric Association, 2000) MDD and HRSD-17 score ≤ 9 (defined by BEV within 7 days after session 20).
- *Remission:* 6 consecutive weeks of absence of DSM-IV MDD and (1) HRSD-17 score ≤ 6 during the A-CT or (2) the LIFE PSR rating was 1 or 2 during experimental and follow-up phases (defined by any project diagnostician).
- *Recovery:* 8 consecutive months of absence of DSM-IV criteria for MDD and (2) LIFE PSR rating of 1 or 2 during experimental and follow-up phases (defined by any project diagnostician).
- *Relapse:* meeting DSM-IV criteria for MDD (i.e., LIFE PSR score of 5 or 6 for 2 weeks) before the criteria for recovery were met (defined by BEV).
- *Recurrence:* meeting DSM-IV criteria for MDD after the criteria for recovery were met (defined by BEV).

Relapse and recurrence were combined in the current analyses and will be referenced singularly from this point forward as relapse/recurrence.

2.3. Procedure

2.3.1. Recruitment and evaluation

Patients in the parent study were recruited through media (newspapers) and referrals from other studies (Jarrett et al., 2001). Following a telephone triage, potentially eligible individuals were seen in the clinic for evaluation. Experienced evaluators used the Structured Clinical Interview for DSM-III-R (Spitzer et al., 1989) and supplemental information gathered from the patient to make a DSM-IV diagnosis and to determine if the patient met inclusion and exclusion criteria. Eligibility was confirmed by an experienced second diagnostician at a follow-up interview.

Inclusion criteria included:

(1) DSM-IV nonpsychotic unipolar MDD
(2) Recurrent MDD with clear inter-episode recovery (≥ 2 episodes of MDD separated by ≥ 2 months of a return to normal functioning)
(3) HRSD-17 score ≥ 16 at initial diagnostic evaluation and follow-up
(4) Written informed consent.

Exclusion criteria included:

(1) Failure to meet any of the above criteria
(2) Contraindicated medical condition or medication
(3) Exclusionary comorbid psychiatric disorder (e.g., psychotic features, current alcohol or other drug abuse or dependency, primary sleep, eating, or sexual disorders, and borderline personality disorder)
(4) Imminent suicide risk at triage
(5) Inability to comply with the protocol.

2.3.2. Acute phase cognitive therapy (A-CT)

The A-CT was administered according to the method described by Beck et al. (1979). The focus of A-CT was on acquiring the basic skills of cognitive therapy to reduce depressive symptoms. Therapy followed a 12 to 14-week protocol, which included twenty 50- to 60-minute individual sessions taking place bi-weekly for the first 8 weeks and then weekly for the remaining 4 weeks and was provided by five experienced therapists. The therapists participated in supervision longitudinally and their competence was evaluated using the Cognitive Therapy Rating Scale (Young and Beck, 1980) and defined by a minimum score of 40. Therapist competence and CONSORT reporting can be found in Jarrett et al. (2001).

2.3.3. Continuation phase cognitive therapy (C-CT)

The same therapist provided A-CT and 10 sessions of C-CT as described by Jarrett (Jarrett, 1989, 1992; Jarrett et al., 2008). Patients were taught to use emotional distress or symptoms to trigger coping skills learned in A-CT. The aim of C-CT was to prevent relapse/recurrence. The therapist and patient focused on reducing residual symptoms, improving coping with adversity, decreasing the probability of stressful events, and enhancing behavioral and cognitive strengths. They worked to generalize and maintain compensatory skills associated with effective symptom reduction and to develop coping strategies in preparation for identified or anticipated vulnerabilities.

Table 2
Distribution of patients within continuation phase cognitive therapy (C-CT) and control conditions, stratified by number of previous episodes and age at onset (AAO).

	Control		C-CT	
	2 Episodes	≥3 Episodes	2 Episodes	≥3 Episodes
	$n=9$	$n=34$	$n=8$	$n=33$
Early AAO	2 (22%)	18 (53%)	3 (38%)	12 (36%)
Late AAO	7 (78%)	16 (47%)	5 (63%)	21 (64%)

Most sessions lasted 60 min, although 90 min were allowed by the protocol. Patients received no monetary incentives.

2.4. Randomization

Responders who completed 20 sessions of A-CT and consented to randomization to either C-CT or evaluation only (control) entered the 8-month experimental phase. Responders were randomized by strata that included the following: (1) number of episodes (2 vs. ≥3); (2) HRSD-17 score (<6 vs. 6–9) from BEV collected within 7 days of session 20; and (3) presence or absence of DSM-IV dysthymia before onset of the presenting episode.

Table 2 shows the distribution of patients within strata based number of previous episodes (defined above) and on age at onset. Age at onset was defined as "early" if first episode of MDD occurred at or before 18 years of age, and as "late" if it occurred after 18 years of age.

Stability of acute phase remission was defined based on HRSD-17 scores during the final six A-CT sessions and first blind evaluation ("unstable" remission = any HRSD-17 score ≥7 vs. "stable" remission = no HRSD-17 scores ≥7). Although the "stability" of acute phase remission was not used in the current analyses, Table 3 shows the distribution of HRSD-17 scores (from BEV collected within 7 days of session 20) within the four groups (i.e., stable control, unstable control, stable C-CT, and unstable C-CT).

In both conditions, patients agreed to remain unmedicated and were scheduled for 10 sessions that occurred biweekly for the first 2 months and monthly for the remaining 6 months. The treating clinician collected self-report questionnaires, assessed diagnostic status according to DSM-IV MDD, recorded any medication use, and completed rating scales. Regardless of diagnostic status, all patients proceeded in C-CT or control conditions until consent was withdrawn or through month 8. All patients were instructed to telephone the evaluator if they became symptomatic between visits. When a blind evaluator determined that the patient had experienced relapse or recurrence, the patient was referred for additional treatment outside of the protocol (e.g., pharmacotherapy).

Table 3
Distribution of 17-item Hamilton Rating Scale for Depression (HRSD-17) scores within experimental phase treatment groups and stability of remission groups.

	Control				C-CT			
	Stable ($n=17$)		Unstable ($n=26$)		Stable ($n=15$)		Unstable ($n=26$)	
	M	(SD)	*M*	(SD)	*M*	(SD)	*M*	(SD)
HRSD-17	2.24	(1.86)	4.73	(3.14)	1.93	(2.49)	4.38	(2.55)

3. Results

3.1. What characteristic symptoms remain after response to A-CT?

To determine prevalence of residual symptoms post-A-CT, we dichotomized HRSD items as: absent = 0 and present ≥1. As can be seen in Table 4, between 2% and 42% of responders continued to report the presence of residual symptoms even after responding to A-CT. Only one person endorsed weight loss (1%) and none endorsed loss of insight (0%), so these were not included in Table 4 because they caused the regression model to fail to converge.

3.2. Which residual symptoms are predictive of depression relapse and recovery?

To answer this question, we first performed a Cox regression analysis, where we simultaneously entered all residuals symptoms reported by >1% of the sample as the independent variables, with time to relapse or recurrence as the dependent variable. This analysis revealed that the model as a whole, which takes into account all residual symptoms similar to previous studies, was predictive of relapse/recurrence χ^2 (15, $n=84$) = 40.05, $p<.001$. As seen in Table 4, several specific residual symptoms were also significant risk factors for relapse/recurrence, including increased late insomnia, decreased agitation, increased psychological anxiety, increased loss of appetite, and increased hypochondriasis.

The parent study had demonstrated that C-CT was preventive of relapse, and C-CT interacted with age at onset (early ≤18 years; late >18 years) and stability of remission post-A-CT (Jarrett et al., 2001) in influencing relapse/recurrence over 24 months. Although "stability of remission" was a significant predictor in the parent study, it was not used in the next analysis because it was originally defined by combining HRSD symptoms, where in the current analysis we were more concerned with individual symptoms (Jarrett et al., 2001). Therefore, an additional hierarchical Cox regression analysis was run with condition (C-CT vs. control), age at onset, and their interaction (condition × age at onset) entered simultaneously with HRSD symptoms reported by >1% of the sample as independent variables, and relapse/recurrence as the dependent variable. The overall model continued to be predictive of relapse/recurrence χ^2 (18, $n=84$) = 50.02, $p<.001$. As can be seen in Table 4, condition and the condition × age at onset interaction continued to be significant predictors of relapse/recurrence. After controlling for the above factors, decreased agitation, increased psychological anxiety, increased loss of appetite, increased loss of libido, and increased hypochondriasis were all individually predictive of relapse/recurrence. This counterintuitive finding of decreased agitation being related to increased relapse/recurrence, was confirmed by investigating this predictor alone. Although not significant, the trend was in the same direction suggesting that the significant prediction of relapse/

Table 4
Summary of regression analyses for variables predicting time to relapse/recurrence of depression.

Variable	Percent of responders	*B*	*SE B*	Wald	Sign.	OR	95.0% CI	
							Lower	Upper
Symptom only model								
Depressed mood	29%	.25	.38	.45	.504	1.29	.62	2.68
Guilt feelings	18%	.51	.56	.82	.367	1.66	.55	4.99
Suicidal ideation	2%	−.21	1.27	.03	.866	.81	.07	9.65
Insomnia (early)	17%	−.98	.52	3.59	.058	.37	.14	1.04
Insomnia (middle)	36%	−.48	.33	2.10	.148	.62	.33	1.18
Insomnia (late)	24%	**.60**	**.29**	**4.16**	**.041**	**1.82**	**1.02**	**3.25**
Decreased work and interest	14%	.36	.37	.92	.337	1.43	.69	2.96
Psychomotor retardation	6%	.72	.74	.95	.330	2.06	.48	8.82
Agitation	6%	**−2.72**	**1.19**	**5.27**	**.022**	**.07**	**.01**	**.67**
Anxiety (psychological)	37%	**.75**	**.38**	**3.97**	**.046**	**2.12**	**1.01**	**4.43**
Anxiety (somatic)	42%	−.14	.26	.32	.572	.87	.52	1.43
Loss of appetite	4%	**2.64**	**.91**	**8.33**	**.004**	**13.98**	**2.33**	**83.83**
Anergia	21%	.36	.57	.41	.521	1.44	.47	4.37
Loss of libido	29%	.54	.30	3.22	.073	1.72	.95	3.12
Hypochondriasis	4%	**2.07**	**1.04**	**3.97**	**.046**	**7.94**	**1.03**	**61.02**
Hierarchical model								
Condition		**3.48**	**1.42**	**6.02**	**.014**	**32.59**	**2.02**	**526.98**
Age at onset		.05	.05	1.01	.316	1.05	.95	1.17
Depressed mood		.25	.39	.40	.526	1.28	.60	2.75
Guilt feelings		.42	.64	.44	.507	1.53	.44	5.36
Suicidal ideation		.30	1.31	.05	.817	1.35	.10	17.82
Insomnia (early)		−.48	.53	.82	.365	.62	.22	1.75
Insomnia (middle)		−.48	.32	2.16	.141	.62	.33	1.17
Insomnia (late)		.49	.31	2.52	.112	1.63	.89	2.99
Decreased work and interest		.47	.37	1.66	.198	1.60	.78	3.28
Psychomotor retardation		−.12	.83	.02	.887	.89	.18	4.49
Agitation		**−2.63**	**1.26**	**4.34**	**.037**	**.07**	**.01**	**.86**
Anxiety (psychological)		**.83**	**.38**	**4.60**	**.032**	**2.28**	**1.07**	**4.85**
Anxiety (somatic)		−.34	.27	1.58	.208	.71	.42	1.21
Loss of appetite		**2.82**	**1.09**	**6.66**	**.010**	**16.78**	**1.97**	**142.93**
Anergia		.63	.56	1.26	.261	1.87	.63	5.57
Loss of libido		**.72**	**.29**	**5.90**	**.015**	**2.05**	**1.15**	**3.65**
Hypochondriasis		**2.62**	**1.14**	**5.23**	**.022**	**13.67**	**1.45**	**128.47**
Condition × AAO		**−.15**	**.06**	**5.69**	**.017**	**.86**	**.77**	**.97**

Note. OR = odds ratio; CI = confidence interval; % = percent of responders to 20 sessions of acute phase cognitive therapy (A-CT) reporting this symptom (i.e., absent = 0 and present ≥ 1); Condition = continuation phase cognitive therapy (C-CT) vs. assessment only control post-acute phase cognitive therapy A-CT; AAO = age at onset; significant variables have been bolded; significance was rounded to the third decimal to show significance of those variables that would have rounded to .05.

recurrence from "decreased" agitation is not simply an artifact of controlling for other symptoms in the full model.

4. Discussion

In the present analysis we aimed to determine (a) the prevalence of specific residual symptoms in patients who responded to A-CT and (b) if any specific residual symptoms were risk factors for increased relapse/recurrence over two year follow-up. A high percentage of patients continued to endorse several residual symptoms after response to A-CT, which was largely consistent with previous research (e.g., Opdyke et al., 1996; Paykel et al., 1999). Adult responders to A-CT continued to report depressed mood, psychic anxiety, somatic anxiety, insomnia, feelings of guilt, anergia, and loss of libido in large percentages. Several of these specific residual symptoms were risk factors for relapse/recurrence, including decreased agitation, and increased psychological anxiety, loss of appetite, loss of libido, and hypochondriasis, after controlling for C-CT, age at onset, and their interaction.

These results indicate that specific residual symptoms may be a reasonable target for intervention if relapse and recurrence are to be prevented. Some studies have examined treating post-medication residual symptoms with CT (Fava et al., 1994; Paykel et al., 1999), with positive results. However, those CT interventions were "generic" and did not appear to target *specific* depressive symptoms, which were likely to persist and predict relapse/recurrence. In the parent study (Jarrett et al., 2001), C-CT reduced relapse over 8 months, which we controlled for, but left it to the patient and therapist to determine how much, if at all, to focus on specific residual symptoms. To increase the impact of CT, targeting the specific symptoms known to forecast relapse/recurrence may reduce such risk.

There was one counterintuitive result. Decreased agitation predicted increased relapse/recurrence. In the current sample, 94% of responders received a score of 0 ("absent") on the HRSD agitation item, and 6% received a score of 1 meaning "fidgety." It is unclear why responders who were not fidgety relapsed/recurred more. One could hypothesize that some responders who were not fidgety had lower activation or increased lethargy (i.e., as seen with psychomotor retardation), although sampling error should be ruled out, as well. Consequently, our finding regarding agitation should be interpreted with caution until it has been replicated.

If the current pattern of results can be replicated, next steps would include exploring why some residual symptoms present greater risk for relapse/recurrence than do other symptoms. For example, the symptom predictors identified in the current analyses may have a greater impact on psychosocial functioning that often deteriorates before relapse and recurrence (Vittengl et al., 2009), or these symptoms possibly are stronger markers of "core" deficits in unipolar depression (Gullion and Rush, 1998). Understanding such mechanisms would inform development of interventions to decrease risk for relapse/recurrence.

While the results of this study shed light on the nature of residual symptoms following response to A-CT, there are limitations which need to be considered when interpreting the results and looking at clinical implications. The findings were based on a limited sample of 84 adults who responded to A-CT. This relatively small number of participants limits the power and generalizability of the findings. The study sample was also restricted in terms of gender, ethnicity, region, mean education level and employed highly competent therapists.

Future studies may want to examine self-report measures of depression in addition to a clinician-rated report, such as the Inventory of Depressive Symptomology-Clinician Rated (IDS-CR) and Inventory of Depressive Symptomology-Self Report (IDS-SR) (Rush et al., 1986). Limiting the current evaluation of symptoms to a clinician rating may have obscured full description of residual symptoms; patients may have different perspectives on the change in their symptoms than clinicians.

Some patients with recurrent MDD have such a high risk for further episodes that full elimination of continuation or maintenance treatment may not be a reasonable objective, until the field discovers a cure for depressive disorders. Patients with recurrent MDD require ongoing clinical monitoring with continuation and maintenance therapies (CT or otherwise) adapted to their particular symptom status and to their early indications of imminent risk of relapse/recurrence. Periodic CT focused on maintaining and extending specific skills acquired during A-CT may be particularly effective for certain patients, not only for reducing the risk of relapse/recurrence, but also for maintaining their gains in psychosocial functioning (Vittengl et al., 2004).

Researchers informed by the current results might test clinically and theoretically interesting potential moderators of residual symptoms' impact on relapse/recurrence (e.g., patients' level of skill acquired during A-CT, personality trait dimensions relevant to depression, age of onset of MDD, continuation treatment type). Future research testing moderators may require larger samples because of the low base rates of residual symptoms among patients who respond to A-CT (e.g., median = 17% for HRSD items in the current sample). When residual symptoms are fully understood, clinicians can begin to develop treatment strategies to target these symptoms. Ideally, the goal would be to make the acute phase of treatment more effective so that a continuation or maintenance phase can be shorter. This analysis identifies symptom targets for both acute and continuation treatment toward the goal of reducing relapse rates among those living with recurrent depression by reducing residual symptoms.

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Conflict of interest

The authors of this manuscript do not have any conflicts of interest that influenced this research, and we complied with APA ethical standards throughout the process of this study. All of the authors listed contributed significantly to the manuscript and have agreed to the authorship order and to submission of the manuscript in this form.

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