Psychiatr. Pol. 2016; 50(4): 787–803
PL ISSN 0033-2674 (PRINT), ISSN 2391-5854 (ONLINE)
www.psychiatriapolska.pl
DOI: http://dx.doi.org/10.12740/PP/59113

The effectiveness of metacognitive training for patients with schizophrenia: a narrative systematic review of studies published between 2009 and 2015

Daniel Pankowski[1], Joachim Kowalski[2], Łukasz Gawęda[3]

[1]Department of Rehabilitation Psychology, Faculty of Psychology, University of Warsaw
[2]Department of Psychology of Individual Differences, Faculty of Psychology, University of Warsaw
[3]Faculty of Psychology, University of Social Sciences and Humanities, Warsaw

Summary

Aim. The aim of this paper is to review results of studies on the effectiveness of metacognitive training (MCT) for patients with schizophrenia in reduction of psychotic symptoms and cognitive biases. Furthermore, other variables, like social functioning, insight and neurocognitive functions, are analyzed.

Method. Systematic search in databases PubMed, EBSCO, Google Scholar, EMBASE, Cochrane Central Register of Controlled Trials and PsycINFO regarding studies on the effectiveness of the MCT was made. The review included 14 studies published in years 2009–2015, in which design of the study made comparison between MCT group and control group possible.

Results. Combined number of patients in MCT group was 354 and 355 in control group. The largest effect size was obtained for severity of delusions ($d < 0.23; 1 >$), especially reduction of conviction and distress of delusional beliefs. An effect size regarding negative symptoms reduction was small. Large effect size was observed for insight improvement ($d < 0.45; 1.32 >$). Positive impact of MCT on cognitive biases severity ($d < 0.21; 0.83 >$, especially jumping to conclusions) and improvement in some aspects of neurocognitive functions was observed ($d < 0.2; 0.63 >$). There was no improvement in social functioning of patients in MCT group. Follow-up studies show sustainability in symptoms improvement lasting at least 6 months.

Conclusions. MCT is an effective form of therapy in reduction of delusions, cognitive biases related to schizophrenia and improvement of insight. Relatively easy accessibility and sustainability of therapeutic effects indicates that MCT can by effectively used in therapy

The study was not sponsored.
The authors D. P. and Ł. G. equally contributed to the article

of schizophrenia. To enhance training efficacy, especially in patients' general functioning, combining it with others forms of therapy is to be considered.

Key words: schizophrenia, group metacognitive training; cognitive biases

Introduction

In most cases schizophrenia is characterized by chronic course [1] with alternating stages of relapses and acute episodes in which positive symptoms, like hallucinations and delusions, can occur. In most cases schizophrenia is related to decrease in social functioning [2], frequent unemployment [3], more frequent solitary habitation [4], more frequent suicide attempts [5]. Half of the patients with schizophrenia diagnosis in Poland receive some form of social benefit, mostly illness allowances, and overall cost of these benefits (nearly billion PLN[1]) is roughly equal to National Health Fund expenditures on medical services and medication for this group of patients [6].

Modern approach to the matter of schizophrenia etiology takes into consideration biological [7], psychological [8] and environmental [9] factors. However, antipsychotic medication is still the most frequent form of therapy [10]. Recent meta-analyses of pharmacological treatment efficacy suggest unsatisfactory response to treatment in this group of patients [11, 12]. About 25% of patients experience psychotic symptoms despite regular medicine intake [13]. Furthermore, therapy based solely on pharmacological treatment does not enable satisfactory improvement in patients' social functioning [14]. These observations encourage clinicians to seek forms of therapy other than pharmacological, to increase overall efficacy of treatment.

Nowadays, cognitive-behavioral therapies (CBTs) [15], trainings of cognitive functions [16], social cognition [17] or metacognitive training [18, 19] are more often used in the treatment of schizophrenia. It is worth noticing that although CBT is recommended in treatment of schizophrenia patients [20], there are no reliable data concerning greater effectiveness of this treatment method in comparison to other psychosocial interventions in this clinical group [21]. However, CBT is one of the most verified psychotherapeutic methods of schizophrenia therapy.

In cognitive model of psychotic symptoms the role of cognitive biases as triggers of delusions and hallucinations is emphasized [22]. In the model of hallucinations created by Bentall [23] and developed by other authors (review [24]), attributional biases process is accentuated. These biases can cause patients to perceive thoughts as alien in origin. External attribution is central for hallucinatory experiences. Some studies also suggest that patients with hallucinatory experiences have a tendency to misidentify fantasy and reality [25, 26]. Cognitive bias based on prematurely, rashly drawn conclusions (so-called jumping to conclusions) seems especially important for delusions [27, 28]. It was also shown that attributional biases play a role in the etiology of delusions [29].

[1] Approximately – about 250 million euro or 280 million American dollars.

Models constructed in such a way gave basis for therapeutic work in cognitive-behavioral approach (CBT) [30]. There are two CBT approaches to be distinguished. The first one concentrates on content of psychotic experiences and the second one concentrates on cognitive biases.

The first approach includes classic forms of CBTp (cognitive-behavioral therapy for psychosis), in which main tenet is to work directly with symptoms experienced by a patient [31]. In CBTp the subject of therapeutic work are specific convictions about reality – both delusional as well as non-delusional – which may contribute to symptoms sustaining. CBTp enhances pharmacological treatment effects. A recent study also suggests that CBTp is effective in treatment of psychotic patients who are not taking antipsychotic medication [32]. Meta-analyses show that CBTp allows for significant, in comparison to control conditions, improvement in symptoms severity and associated distress [33]. However, CBTp therapy is still out of reach for many patients. It causes researchers to seek for more accessible, structured forms of therapy and trainings.

These searches resulted in creating metacognitive approach. The basic assumption of this approach is not to work with psychotic experiences but to concentrate on cognitive biases that underlie these symptoms. One of the methods based on this approach, also accessible in Poland [18, 19], is metacognitive training (MCT) [33]. Description of method and clinical experiences of MCT in Poland can be found in work of Gawęda et al. [19].

MCT is a group (3–10 patients) form of therapy which focuses on cognitive biases related to psychotic symptoms. Basic aim of MCT is to increase awareness of cognitive biases and distortions; enriching and changing repertoire of problem-solving strategies and encouraging patients to critical reflection (e.g., on consequences of cognitive biases) [34]. MCT enables discussion with patients on particular cognitive biases, their impact on the development of psychosis and impact on social functioning. Training consists of 8 modules depicting biases linked most commonly to psychotic symptoms (jumping to conclusions, dysfunctional attributional styles, biases against disconfirmatory evidence, social cognition deficits, depressive schemes and overconfidence of false memories).

Aim

The aim of this paper is to conduct systematic review of studies of group MCT efficacy in different aspect of patients' functioning. This review focuses on a broad spectrum of variables which can be influenced by MCT. Analyses focused on MCT influence on psychotic symptoms, cognitive biases, social functioning, insight and neurocognition.

Method

Studies of the effectiveness of MCT published in years 2009–2015 were selected by screening following databases: PubMed, EBSCO, Google Scholar, EMBASE,

Cochrane Central Register of Controlled Trials and PsycINFO. Following keywords were used for searching target articles: "MCT schizophrenia", "metacognitive training schizophrenia" and "metacognition schizophrenia". Reference lists were also scanned with a purpose of identification of potential suitable studies.

After obtaining all studies concerning MCT efficacy, clinical studies in which comparison between experimental and control group was possible were selected. Studies concerning proceedings on MCT adaptation, training procedure and theoretical background descriptions as well as modifications with individual training sessions were excluded from the analysis.

First, as an indicator of the effectiveness of MCT, statistical significance at the level of $p < 0.05$ was considered. Additionally, due to low statistical power (e.g., small samples) of some studies, effect size was calculated and analyzed (an assessment of impact of MCT on outcome variables). Results are interpreted as follows: $d < 0.2$ – no effect; $0.2 < d < 0.5$ – small effect size; $0.5 \leq d < 0.8$ – medium effect size; $d > 0.8$ – large effect size. This review used Cohen's *dcorr* [35], which takes into consideration sample size and group differences in the first measurement (pre-test), or values of Cohen's d statistic given by the authors of studies.

Results

As a result of database search 27 studies were identified. However, some of the studies did not meet the inclusion criteria. Six articles concerned descriptions of MCT method [18, 19, 36–39], two concerned feasibility and adherence of MCT assessed by patients [40, 41] and one was a case study [42]. Moreover studies were excluded because of: individual sessions with patients [43], lack of control group [44, 45] and lack of English version of the paper [46].

Table 1. **Methodological characteristic of the analyzed studies**

No.	Study	Study group	Intervention in control group	Randomization	Single-blind study	Follow-up	Number of sessions
Randomized controlled trials (RCT)							
1.	Aghotor et al., 2010 [47]	Inpatients of psychiatric ward	Discussion group	+	+	-	8
2.	Kumar et. al., 2010 [48]	Inpatients of psychiatric ward	TAU	+	n.a.	-	8
3.	Moritz et al., 2011 [49]	Inpatients of psychiatric ward, also with secondary substance-related diagnosis	TAU	+	+	-	8
4.	Briki et al., 2014 [50]	Inpatients of psychiatric hospitals	Supportive therapy	+	+	-	16

table continued on the next page

5.	Gawęda et al., 2015 [51]	Clients of Community Social Support Group Program	TAU	+	Partially	-	
6.	Lam et al., 2015 [52]	Inpatients of psychiatric centers	TAU	+	Self-report assessment measures	-	8
7.	Favrod et al., 2014 [53]	Outpatiens of psychiatric centers	TAU	+	+	After 6 months	8
8.	Kuokkanen et al., 2014 [54]	Inpatients of forensic psychiatry ward	TAU	+	+	After 3 and 6 months	8
9.	van Oosterhout et al., 2014 [55]	Inpatients of psychiatric hospitals	TAU	+	+	After 6 months	8
10.	Moritz et al., 2013 [56]	Inpatients of two psychiatric centers	Cognitive remediation	+	+	After 6 months	8 and another 8 between post-treatment and follow-up assessment
11.	Moritz et al., 2014 [57]	Inpatients and outpatiens of psychiatric wards	Cognitive remediation	+	+	After 6 months and 3 years	8 and another 8 between post-treatment and follow-up assessment
Non-randomized controlled studies (NRS)							
12.	Naughton et al., 2012 [58]	Inpatients of forensic psychiatry ward	TAU	-	Partially	-	16
13.	Rocha et al., 2013 [59]	Clients of socio-occupational centers	TAU	-	n.a.	-	18
14.	Erawati et al., 2014 [60]	Inpatients of psychiatric wards	TAU	-	n.a.	-	8

TAU – treatment as usual; + – use of certain methodological procedure; – – certain methodological procedure was not used; n.a. – data not available

Finally, 14 studies of clinical effectiveness of MCT were analyzed. Table 1 presents characteristics of studies included in the review. Eleven of the described studies are randomized controlled trials (RCT) [47–57]; in most cases assessors were blind to allocation of participants in groups [47, 49–58]. Worth noticing is that only in

Table 2. **An overview of the analyzed studies of metacognitive training efficacy**

No.	Study	N	Psychopathology		Cognitive biases	
			Tools	Results	Tools	Results
Randomized controlled trials (RCT)						
1.	Aghotor et al., 2010 [47]	30: MCT – 16; TAU – 14	PANSS	No significant results (PANSS P: d = 0.43, PANSS: d = 0.23)	Jumping to conclusions: BADE	No significant results (d = 0.31)
2.	Kumar et al., 2010 [48]	16: MCT – 8; TAU – 8	PANSS, BABS	Improvement in positive symptoms (d = 1.10) in PANSS; improvement in insight and delusions certainty (d = 1.00) in BABS	data not available	
3.	Moritz et al., 2011 [49]	36: MCT – 18; TAU – 18	PANSS, PSYRATS	Improvement in distress caused by delusions (PSYRATS: Intensity of distress d = 0.68)	Jumping to conclusions: Fish Task	No significant results (d = 0.52)
4.	Briki et al., 2014 [50]	50: MCT – 25; TAU – 25	PANSS, PSYRATS	Improvement in positive symptoms (d = 0.61) in PANSS	data not available	
5.	Gawęda et al., 2015 [51]	44: MCT – 23; TAU – 21	PSYRATS, Paranoia Checklist	Improvement in positive symptoms (d = 0.54) (PSYRATS); frequency (d = 0.75) and conviction (d = 0.57) of delusions (Paranoia Checklist)	CBQ-P, Eye-test, Jumping to conclusions: Fish Task	Overall improvement in CBQ (d = 0.83), catastrophizing (d = 0.83), jumping to conclusions (d = 0.74) and emotion based reasoning (d = 0.79)
6.	Lam et al. 2015 [52]	77; MCT – 38; TAU – 39	data not available	data not available	data not available	
7.	Favrod et al., 2015 [53]	52: MCT – 26; TAU – 26	PANSS, PSYRATS	Improvement in positive symptoms (PANSS P: d = 0.7; 6-month follow-up d = 0.63); delusions (PSYRATS: d = 0.58; 6-months follow-up: d = 0.57; conviction d = 0.70; 6-month follow-up d = 0.86); improvement in delusion distress after 6 months: PSYRATS distress: d = 0.42	data not available	
8.	Kuokkanen et al., 2014 [54]	20: MCT – 10; TAU – 10	3 items from PANSS (P1, P6, G12), PSYRATS	Improvement in Suspiciousness/persecution – P6 in PANSS after 3 – and 6-month follow-up. Lack of data necessary to calculate effect size*	Jumping to conclusions: Fish Task	Lack of data necessary to calculate effect size*
9.	van Oosterhout et al., 2014 [55]	128; MCT – 58; TAU – 70	PSYRATS, GPTS	Improvement in persecutory delusions in GPTS after 24-week follow-up (d = 0.4)	DACOBS, MCQ-30	No significant results (DACOBS: d = 0.3 and 0.42, scales of MCQ ranging from d = 0.05 to d = 0.46)

10.	Moritz et al., 2013 [56]	150: MCT – 76; TAU – 74	PANSS, PSYRATS	Overall improvement in delusions severity (PSYRATS Delusions: d = 0.37) after 6-month follow-up (PSYRATS Delusions: d = 0.57; PANSS core delusion d = 0.43)	Jumping to conclusions: Fish Task	No significant results (d = 0.21)
11.	Moritz et al., 2014 [57]	150: MCT – 76; TAU – 74	PANSS, PSYRATS	Improvement in positive symptoms (PANSS P: d = 0.52) and delusions assessed by PANSS (d = 0.45) and PSYRATS (d = 0.59) after 3-year follow-up	Jumping to conclusions: Fish Task	No significant results (d = 0.16)
Non-randomized controlled studies (NRS)						
12.	Naughton et al., 2012 [58]	19: MCT – 11; TAU – 8	PANSS	No significant results (PANSS P: d = 0.37, PANSS N: d = 0.72, PANSS: d = 0.44)	data not available	
13.	Rocha et al., 2013 [59]	35: MCST – 19; TAU – 16	PANSS	Improvement in overall psychopathology (PANSS G: d = 0.30)	Facial emotion recognition (FEIT), Emotion regulation (MSCEIT-ME), Theory of mind (hinting task), Attributional styles (AIHQ-A), Social perception (SPS), Jumping to conclusions: Fish Task	Improvement in theory of mind (d = 0.42), social perception (d = 0.6), emotion recognition (d = 0.76) and more draws to decision (d = 0.53)
14.	Erawati et al., 2014 [60]	52: MCT – 26; TAU – 26	PSYRATS	Improvement in delusions severity. Lack of data necessary to calculate effect size*	Metacognitive Ability Questionnaire	Improvement in metacognitive abilities. Lack of data necessary to calculate effect size*

MCT – Metacognitive Training; TAU – Treatment as Usual; PANSS – Positive and Negative Syndrome Scale; BADE – Bias Against Disconfirmatory Evidence; BABS – Brown Assessment of Beliefs Scale; PSYRATS – Psychotic Symptoms Rating Scales; CBQ-P – Cognitive Biases Questionnaire for Psychosis; GPTS – Green Paranoid Thought Scale; DACOBS – Davos Assessment of Cognitive Biases Scale; MCQ-30 – Metacognitive Questionnaire; MCST – Metacognitive and Social Cognition Training; FEIT – Facial Emotion Identification Test; MSCEIT-ME – Mayer-Salovey-Caruso Emotional Intelligence Test; AIHQ-A – Ambiguous Intentions Hostility Questionnaire; SPS – Social Perception Scale; d – Cohen's d effect size; * – lack of post test data, only difference between pre and post test measurements, without standard deviation value.

four studies [47, 50, 56, 57] active intervention, which could minimize the effect of additional time spent with the therapist, was included in control group. Groups with treatment as usual (TAU) were the most common groups of reference in studies on the effectiveness of MCT. In these studies TAU consists of various psychotherapeutic activities – from elements of psychoeducation [48] to elaborate psychotherapeutic programs [51]. Lam et al. in their study [52] have investigated only insight (lack of symptoms severity and cognitive biases assessment; Table 2). This study was included into the review because it fulfills the criteria of clinical insight assessment. In one of the studies [59] the analyses concerned a fusion of metacognitive training and a social cognition programs. It consisted of 18 sessions: meetings twice a week with one MCT session and one interactive social cognition remediation session.

A total of 709 patients were included in the reviewed studies – 354 people in experimental group with metacognitive training and 355 in the control group with active placebo and treatment as usual. Studies were conducted in independent clinical centers in Germany, Portugal, Poland, France, Switzerland, Ireland, Finland, the Netherlands, Indonesia, India and Hong Kong in years 2009–2015. Two studies [54, 58] included patients of facilities for convicted persons with diagnosis of mental illness.

Impact of MCT on psychopathology symptoms

Assessment of schizophrenia symptoms severity was performed in ten randomized controlled trials [47–51, 53–57] and three non-randomized controlled studies [58–60]. Two studies [54, 60] lack data necessary to compute effect size – there were no post-test results, only difference between pre – and post-test but without the standard deviation values.

Positive symptoms were assessed in ten randomized controlled trials [47–51, 53–57] and three non-randomized controlled studies [58–60]. A significant improvement ($p < 0.05$) was observed in nine of them [47, 48, 50, 51, 53, 54, 56, 57, 60] and effect sizes ranged from small [56], through medium [49–51, 53, 57], to large [48]. In analyzes of Aghotor [47] and van Oosterhout [55] there were no statistically significant differences between the studied groups, but small effect size was observed for positive symptoms measured on PANSS [47] ($d = 0.43$), overall score ($d = 0.23$) and persecutory delusions ($d = 0.26$), as well as in Green Paranoid Thoughts Scale (GPTS) [55]. In the study by Gawęda et al. [51] there was a reduction in total severity of symptoms (PSYRATS) at the statistical trend level ($p = 0.08$) and the effect size was $d = 0.54$. There were no statistically significant differences in severity of hallucinations and delusions. The observed effect sizes were as follows: hallucinations frequency ($d = 0.27$), amount of negative content in auditory hallucinations ($d = 0.21$), degree of negative contents in auditory hallucination ($d = 0.23$), distress connected to hallucinations ($d = 0.23$), frequency of delusional preoccupation ($d = 0.25$) and distress connected to delusions ($d = 0.29$) measured using the same scale. In the study by Briki et al. [50] improvement in delusions severity in PANSS at statistical tendency level with effect size $d = 0.38$

was observed. In studies by Rocha et al. [59] and Naughton et al. [58] there were no significant differences between groups and the effect size was small ($d < 0.2$).

Impact of MCT on negative symptoms was analyzed in two randomized controlled trials [48, 49] and two non-randomized controlled studies [58, 59]. None of them achieved statistically significant results. In the study by Naughton et al. [58], despite insignificant results ($p > 0.05$), medium effect size was observed ($d = 0.72$).

Impact of MCT on overall psychopathology symptoms severity (General Psychopathology score in PANSS) was included in three randomized controlled trials [48–50] and one non-randomized controlled study [58]. In none of them statistically significant results were obtained. In one of the studies [58] medium effect size for general symptoms severity was observed ($d = 0.67$) and in the study by Kumar et al. [48] small effect size was shown ($d = 0.41$).

In the study by Briki et al. [50] small effect size of "preoccupation with own thoughts" ($d = 0.27$) and "active social avoidance" ($d = 0.27$) in PANSS was observed. In the study by Moritz et al. [49] from 2011 small effect size was obtained ($d < 0.2$) for conceptual disorganization, excitement and distress.

Impact of MCT on cognitive biases

In six randomized controlled trials [47, 49, 51, 54, 56, 57] and one non-randomized controlled study [59] impact of MCT on jumping to conclusions (JTC) severity was analyzed. One of the studies [54] lacks data necessary to compute effect size – there were no post-test results, only difference between pre – and post-test but without the standard deviation values. In other study [59] statistically significant improvement was observed in jumping to conclusions severity, which means more draws needed to make a decision ($d = 0.53$). In the study by Moritz et al. [49], despite no significant results, medium effect size was observed ($d = 0.52$) and small effect size in studies by Aghotor et al. ($d = 0.31$) [47] and Moritz et al. ($d = 0.21$) [56]. In two studies [51, 57] there were no significant differences between groups and effect size was small ($d < 0.2$).

In two newer randomized controlled trials cognitive biases were assessed with self-report questionnaires [51, 55]. In one of these studies [51], there was statistically significant improvement in cathastrophizing ($d = 0.83$), emotion based reasoning ($d = 0.79$), jumping to conclusions ($d = 0.73$) and overall score ($d = 0.83$) of CBQp, which is used to assess cognitive biases. In one of the studies [55], despite no statistically insignificant results, there was a medium effect size observed in subjective measure of social cognition deficits ($d = 0.28$).

Impact of MCT on neurocognitive functions

Assessment of cognitive functioning was performed in four randomized controlled trials [49, 51, 56, 57] and one non-randomized controlled study [59]. Statistically significant difference ($p < 0.05$) was shown in two studies for: attentional functions [57]

(d = 0.21) and recollection of verbal material after delay (d = 0.63) [49]. In these studies, despite no significant differences between groups, medium effect size was observed for immediate recollection of verbal material improvement (d = 0.63) [49] and small effect size for attentional processes and visuospatial aspects of working memory (d = 0.20) [57].

Impact of MCT on general functioning

MCT impact on general level of psychological, social and professional functioning was assessed in two randomized controlled trials [50, 51] and one non-randomized controlled study [58]. In studies by Naughton et al. (GAF; d = 1.49) [58] and Briki et al. (QLS "Social circle"; d = –0.35) [50] there was a statistically significant change in comparison to control group. In this study, despite no statistically significant difference, small effect size in social initiatives was observed (d = 0.49) [50]. In the study by Gawęda et al. [51], conducted among chronic patients attending Community Social Support Group Program, there were no statistically significant differences between the two compared groups and effect size was small (d < 0.2).

Impact of MCT on insight

Insight was assessed in six randomized controlled trials [48, 50–53, 55]. Results of four studies show significant improvement with effect size ranging from small (delusions awareness: d = 0.45) [53], through medium (d = 0.56) [51] to large (d = 1.01; d = 1.10; d = 1.32) [48, 52]. In one study, despite lack of statistically significant results, small effect size was observed: (d = 0.34) [50]. Furthermore in the study by Favrod et al. [53] small effect size in delusion attribution in SUMD (d = 0.24) was observed, despite lack of statistically significant results. In one study [55] there were no significant results and effect size was infinitesimal (d < 0.2).

Sustainability of therapeutic effects: longitudinal studies

In four randomized controlled trials [53–56] follow-up assessments were conducted after six months and in one study, after three years [57]. The study by Kuokkanen et al. [54] lacks data necessary to compute effect size.

The study by Favrod et al. [53] indicates sustained positive impact of MCT on positive symptoms severity (PANSS P: d = 0.63), especially delusions (PSYRATS Delusions: d = 0.57; "Delusional conviction" scale: d = 0.86; "Distress connected to delusions" scale: d = 0.52) after six months. Studies by Moritz et al. [56] (d = 0.34) and van Oosterhout et al. [55] (d = 0.40) also indicate improvement in delusions severity after six months. The study by Kuokkanen et al. [54] indicates improvement in suspiciousness after 3 and 6 months. Furthermore, in the study by Favrod et al. [53] there was a statistically significant difference between groups in the level of insight (d = 0.47) after six months.

In the study by Moritz et al. [57] there was an impact of MCT on positive symptoms severity (PANSS P: d = 0.52), including delusions (PANSS Delusions: d = 0.45; PSYRATS Delusions: d = 0.59) after three years.

In another study [56], despite no statistically significant differences in assessments, small effect size was observed for improvement in cognitive biases: in need of more draws to make a decision (d = 0.21). In the study by van Osterhout et al. [55] in second assessment after six months, improvement in subjective cognitive problems (d = 0.25) and conviction of lack of control (d = 0.22) in DACOBS and MCQ-30 was observed.

Discussion

The aim of this review was to analyze effectiveness of metacognitive training for patients with schizophrenia in the context of: 1) psychotic symptoms; 2) cognitive biases; 3) neurocognitive function; 4) general functioning; 5) insight. Sustainability of improvement in randomized controlled trials with assessment after 6 months and 3 years was also analyzed.

Empirical evidence indicate satisfactory efficacy of MCT in improvement of positive symptoms [48–51, 53, 54, 56, 57, 60] lasting at least half a year after participation in the training [53, 56]. The most recent study also shows sustained improvement after three-year follow-up period [57]. The largest improvement was shown for delusions [53], especially distress caused by delusions [49], level of conviction towards delusions [53] and their frequency [51]. Some studies also show improvement in hallucinations severity [50]. Our review suggests that MCT can have smaller effect on hallucinations in comparison to delusions. This result is not surprising regarding that MCT interventions target mainly cognitive biases related to delusions (jumping to conclusions – JTC). Not all obtained results were significant, despite of at least small [47, 58] effect size. One of the reasons may be small sample size that cause lower statistical power. Lack of satisfactory improvement may also be related to low intensity of MCT [61], which can be increased by the addition of Individualized Metacognitive Therapy for Psychosis (MCT+) [61]; it can also be complemented by other psychotherapeutic activities. It may be especially relevant in case of patients with chronic experience of psychotic symptoms [51].

According to cognitive model of psychosis [22], in MCT symptoms improvement is obtained through improvement in cognitive biases severity. Findings from the review suggest positive impact of MCT on cognitive biases underlying psychotic symptoms (especially delusions). The largest effect size was observed in JTC [51, 59], emotion-based reasoning and catastrophizing [51]. It has to be noted that in the study by Rocha et al. [59] a broad selection of assessment tools for cognitive biases was used, however, there is no possibility of comparing these results, concerning for example theory of mind, with results from other studies. Similarly, positive effect of MCT on cognitive biases measured by questionnaires was observed in the study by Gawęda et al. [51], however, with no effect of MCT on JTC and theory of mind

deficits as assessed with experimental methods. This result may suggest that among chronic schizophrenia patients the cognitive aspect of cognitive biases can be easier to change than the behavioral component. This issue requires further studies comparing patients' response to MCT in different aspects of cognitive biases (e.g., cognitive aspect – self-awareness of cognitive biases vs. behavioral aspect – behavior that is revealed in experimental paradigm and shows cognitive biases).

Despite that improvement in neurocognitive functions is not an aim of MCT, some studies show positive effect of MCT on these functions. Positive impact on attentional functions and recollection of verbal material after delay was observed [49, 57]. However, it was not confirmed by all of the studies [51, 56, 59]. Some improvements in neurocognitive functioning may reflect connections between cognitive biases and neurocognition [62]. It is possible that therapeutic work with cognitive biases in MCT may affect neurocognitive functions [62]. It is worth to notice that one of the modules (memory) is devoted to strategies of better remembering and may have an impact on cognitive functions.

A significant result, from clinical point of view, is an improvement in insight gained through participation in MCT [52]. Randomized controlled trials with follow-up assessment show sustained effects of MCT on clinical insight [53]. Also the study conducted among chronically ill patients attending Community Social Support Group Program indicates that MCT positively impacts patients' insight (large effect size) [51]. Improvement of clinical insight is significant in the context of patient-physician compliance and motivation to stay in treatment. Indeed, as shown in other study, insight is positively correlated with help-seeking behavior in patients [63]. MCT helps to gain clinical insight which may positively impact patients' attitude towards treatment.

Final conclusions form the review of studies of the effectiveness of MCT should be considered in the light of studies' limitations. In five studies [47, 49, 54, 58, 59] researchers named small sample sizes as a problem, in two studies contact between patients of experimental and control group was an issue [49, 57]. Rocha et al. [59], Erawati et al. [60] and Naughton et al. [58] pointed out lack of randomization as a disadvantage. In studies by Naughton et al. [58], Rocha et al. [59] and Favrod et al. [53] there was no active placebo for patients from waiting lists. Moritz et al. [56], in the discussion of their results, put information about too short period between main assessment and follow-up assessment (6 months) and small numbers of controlled variables, similarly to van Oosterhout et al. [55]. Favrod et al. [53] noticed significant delusions severity in patients in the period of 3 months before the research. Van Oosterhout et al. [55] pointed out using older version of MCT (2007), drop-out of patients between assessments and using large amount of self-description questionnaires.

Studies concerning efficacy of MCT differ in methods of symptoms severity assessment. Furthermore, the range of considered variables is heterogeneous (heterogeneous assessment of cognitive biases; insight and social functioning were assessed only in few studies). Considering heterogeneity of studies, the authors did not employ meta-analysis in this review [64]

Further research directions may be assessing efficacy of MCT in group at risk of developing psychotic disorders (At Risk Mental State). Similar studies [65] applying CBTp have shown efficacy of this therapeutic method. The aspect of social functioning (e.g., Global Assessment of Functioning – GAF, Social Functioning Scale – SFS) of patients who took part in metacognitive training (prospective study) is also worth analyzing.

Conclusions

1. The highest effectiveness of MCT was observed for reduction of delusions severity.
2. Metacognitive training allows for effective therapeutic work with cognitive biases related to delusions.
3. Metacognitive training allows for clinical (self-awareness of symptoms) and cognitive (self-awareness of cognitive deficits and biases) insight build-up in patients with schizophrenia.
4. Randomized controlled trials with follow-up assessment suggest that improvement in symptoms and insight lasts at least 6 months.

References

1. Pużyński S, Wciórka J. ed. *Klasyfikacja zaburzeń psychicznych i zaburzeń zachowania w ICD-10: opisy kliniczne i wskazówki diagnostyczne*. Krakow–Warsaw: University Medical Publishing House "Vesalius"; 2007.
2. Ritsner M. *Predicting changes in domain-specific quality of life of schizophrenia patients*. J. Nerv. Ment. Dis. 2003; 191(5): 287–294.
3. Jaracz K, Górna K, Kiejda J, Rybakowski J. *Prospektywna ocena wczesnego przebiegu schizofrenii u kobiet i mężczyzn po pierwszej hospitalizacji psychiatrycznej*. Psychiatr. Pol. 2008; 42(1): 33–46.
4. Cechnicki A, Hanuszkiewicz I, Polczyk I, Bielańska A. *Prospektywna ocena wpływu czasu nie leczonej psychozy na przebieg schizofrenii.* Psychiatr. Pol. 2010; 44(3): 381–394.
5. Gómez-Durán EL, Martin-Fumadó C, Hurtado-Ruíz G. *Clinical and epidemiological aspects of suicide in patients with schizophrenia*. Actas Esp. Psiquiatr. 2012; 40(6): 333–345.
6. Kiejna A, Piotrowski P, Adamowski T. ed. *Schizofrenia. Perspektywa społeczna. Sytuacja w Polsce.* http://www.watchdogpfron.pl/wp-content/uploads/2014/02/Raport_Schizofreni a2.pdf [retrieved: 28.07.2016].
7. Strous RD, Shoenfeld Y. *Schizophrenia, autoimmunity and immune system dysregulation: a comprehensive model updated and revisited*. J. Autoimmun. 2006; 27(2): 71–80.
8. Janssen I, Krabbendam L, Bak M, Hanssen M, Vollebergh W, de Graaf R. et al. *Childhood abuse as a risk factor for psychotic experiences*. Acta Psychiatr. Scand. 2004; 109: 38–45.
9. Selten JP, Cantor-Graae E, Kahn RS. *Migration and schizophrenia*. Curr. Opin. Psychiatry 2007; 20(2): 111–115.

10. Jarema M, Kiejna A, Landowski J, Meder J, Rabe-Jabłońska J, Rybakowski J. *Standardy leczenia farmakologicznego schizofrenii*. Psychiatr. Pol. 2006; 40: 1171–1205.

11. Leucht S, Barnes TR, Kissling W, Engel RR, Correll C, Kane JM. *Relapse prevention in schizophrenia with new-generation antipsychotics: a systematic review and exploratory meta-analysis of randomized, controlled trials*. Am. J. Psychiatry 2003; 160(7): 1209–1222.

12. Leucht S, Arbter D, Engel RR, Kissling W, Davis JM. *How effective are secondgeneration antipsychotic drugs? A meta-analysis of placebo-controlled trials*. Mol. Psychiatry 2009; 14: 429–447.

13. Craig T, Garety P, Power P, Rahaman N, Colbert S, Fornells-Ambrojo M. et al. *The Lambeth Early Onset (LEO) Team: randomised controlled trial of the effectiveness of specialised care for early psychosis*. Br. Med. J. 2004; 329: 1067–1071.

14. Jääskeläinen E, Juola P, Hirvonen N, McGrath JJ, Saha S, Isohanni M. et al. *A systematic review and meta-analysis of recovery in schizophrenia*. Schizophr. Bull. 2013; 39(6):1296–1306.

15. Lynch D, Laws KR, McKenna PJ. *Cognitive behavioural therapy for major psychiatric disorder: Does it really work? A meta-analytical review of well-controlled trials*. Psychol. Med. 2009; 29: 1–16.

16. Linke M, Jarema M. *Cognitive rehabilitation for people living with schizophrenia – the newest interventions*. Psychiatr. Pol. 2014; 48(6): 1179–1188.

17. Horan WP, Kern RS, Shokat-Fadai K, Sergi MJ, Wynn JK, Green MF. *Social cognitive skills training in schizophrenia: an initial efficacy study of stabilized outpatients*. Schizophr. Res. 2009; 107(1): 47–54.

18. Gawęda Ł, Moritz S, Kokoszka A. *Podstawy teoretyczne treningu metapoznawczego dla chorych na schizofrenię*. Psychiatr. Pol. 2009; 43(6): 671–682.

19. Gawęda Ł, Moritz S, Kokoszka A. *Trening metapoznawczy dla chorych na schizofrenię. Opis metody i doświadczeń klinicznych*. Psychiatr. Pol. 2009; 43(6): 683–692.

20. Stahl SM, Morrissette DA, Citrome L, Saklad SR, Cummings MA, Meyer JM. et al. *"Metaguidelines" for the management of patients with schizophrenia*. CNS Spectr. 2013; 18(3): 150–162.

21. Jones C, Hacker D, Cormac I, Meaden A, Irving CB. *Cognitive behaviour therapy versus other psychosocial treatments for schizophrenia*. Cochrane Database Syst. Rev. 2012; 4: CD008712.

22. Garety PA, Kuipers E, Fowler D, Freeman D, Bebbington PE. *A cognitive model of the positive symptoms of psychosis*. Psychol. Med. 2001; 31(02): 189–195.

23. Bentall RP. *Ilusion of reality: a review and integration of psychological research on auditory hallucinations*. Psychol. Bull. 1990; 107: 82–95.

24. Woodward TS, Menon M. *Misattribution models and source monitoring in hallucinating schizophrenia subjects*. In: Jardri R, Pins D, Cachia A, Thomas P. ed. *The neuroscience of hallucinations*. New York: Springer; 2013. p. 169–184.

25. Gawęda Ł, Moritz S, Kokoszka A. *Impaired discrimination between imagined and performed actions in schizophrenia*. Psychiatry Res. 2012; 195: 1–8.

26. Gawęda Ł, Holas P, Kokoszka A. *Do depression and anxiety mediate the relationship between meta-cognitive beliefs and psychological dimensions of auditory hallucinations and delusions in schizophrenia?* Psychiatry Res. 2013; 210: 1316–1319.

27. Garety PA, Hemsley DR, Wessely S. *Reasoning in deluded schizophrenic and paranoid patients. Biases in performance on a probabilistic inference task*. J. Nerv. Ment. Dis. 1991; 179: 194–201.

28. Sartup H, Freeman D, Garety PA. *Jumping to conclusion and persecutory delusions*. Eur. Psychiatry 2008; 23: 457–459.

29. Kaney S, Bentall RP. *Persecutory delusions and attributional style*. Br. J. Med. Psychol. 1989; 62: 191–198.

30. Rector NA, Beck AT. *Cognitive therapy for schizophrenia: from conceptualization to intervention*. Can. J. Psychiatry 2002; 47(1): 39–48.

31. Rector N, Stolar N, Grant P. *Schizophrenia: cognitive theory, research, and therapy*. New York: Guilford Press; 2011.

32. Morrison AP, Turkington D, Pyle M, Spencer H, Brabban A, Dunn G. et al. *Cognitive therapy for people with schizophrenia spectrum disorders not taking antipsychotic drugs: a single-blind randomised controlled trial*. Lancet 2014; 383(9926): 1395–1403.

33. Butler AC, Chapman JE, Forman EM, Beck AT. *The empirical status of cognitive-behavioral therapy: A review of meta-analyses*. Clin. Psychol. Rev. 2006; 26: 17–31.

34. Moritz S, Woodward TS, Burlon M. *Metacognitive skill training for patients with psychosis (MCT). Manual*. Hamburg: Van Ham Campus; 2005.

35. Klauer KJ. *Handbuch Kognitives Training*. Göttingen: Hogrefe; 2001.

36. Moritz S, Woodward TS. *Metacognitive training in schizophrenia: from basic research to knowledge translation and intervention*. Curr. Opin. Psychiatry 2007; 20(6): 619–625.

37. Moritz S, Vitzthum F, Randjbar S, Veckenstedt R, Woodward TS. *Detecting and defusing cognitive traps: metacognitive intervention in schizophrenia*. Curr. Opin. Psychiatry 2010; 23(6): 561–569.

38. Menon M, Balzanc RP, Harper-Romeo K, Kumar D, Andersen D, Moritz S. et al. *Psychosocial approaches in the treatment of psychosis: Cognitive behaviour therapy for psychosis (CBTp) and metacognitive training (MCT)*. Clin. Schizophr. Relat. Psychoses 2015; 1–24.

39. Schneider BC, Andreou C. *A critical review of metacognitive training (MCT) for psychosis: Efficacy, proposed mechanisms of action and significance for functional outcomes*. OA Behav. Med. 2014; 2(1): 1.

40. Howe LJ, Brown ID. *Investigating the usefulness of a metacognitive training group programme for schizophrenia*. Psychiatr. Bull. 2014; 1: 5.

41. Moritz S, Woodward TS. *Metacognitive training for schizophrenia patients (MCT): a pilot study on feasibility, treatment adherence, and subjective efficacy*. Ger. J. Psychiatry 2007; 10(3): 69–78.

42. Bhogta SK, Sengar KS, Singh AR. *Metacognitive training (MCT) in facilitating awareness of metacognition and delusion: A case study of delusional disorder*. Indian J. Clin. Psychol. 2014; 41(1): 76–81.

43. Balzan RP, Delfabbro PH, Galletly CA, Woodward TS. *Metacognitive training for patients with schizophrenia: Preliminary evidence for a targeted, single-module programme*. Aust. N. Z. J. Psychiatry 2014; 48(12): 1126–1136.

44. Favrod J, Maire A, Bardy S, Pernier S, Bonsack C. *Improving insight into delusions: a pilot study of metacognitive training for patients with schizophrenia*. J. Adv. Nurs. 2011; 67(2): 401–407.

45. Morrison AP, Pyle M, Chapman N, French P, Parker SK, Wells A. *Metacognitive therapy in people with a schizophrenia spectrum diagnosis and medication resistant symptoms: a feasibility study*. J. Behav. Ther. Exp. Psychiatry 2014; 45(2): 280–284.

46. Ferwerda J, de Boer K, van der Gaag M. *Metacognitive training for patients with psychotic vulnerability*. Directieve Therapie 2010; 30: 263–279.

47. Aghotor J, Pfueller U, Moritz S, Weisbrod M, Roesch-Ely D. *Metacognitive training for patients with schizophrenia (MCT): Feasibility and preliminary evidence for its efficacy*. J. Behav. Ther. Exp. Psychiatry 2010; 41: 207–211.

48. Kumar D, Zia Ul Haq M, Dubey I, Dotivala KN, Veqar Siddiqui S, Prakash R. et al. *Effect of meta-cognitive training in the reduction of positive symptoms in schizophrenia*. Eur. J. Psychother. Couns. 2010; 12(2): 149–158.

49. Moritz S, Kerstan A, Veckenstedt R, Randjbar S, Vitzthum F, Schmidt C. et al. *Further evidence for the efficacy of a metacognitive group training in schizophrenia*. Behav. Res. Ther. 2011; 49: 151–157.

50. Briki M, Monnin J, Haffen E, Sechter D, Favrod J. Netillard C. et al. *Metacognitive training for schizophrenia: A multicentre randomised controlled trial*. Schizophr. Res. 2014; 157(1): 99–106.

51. Gawęda Ł, Krężołek M, Olbryś J, Turska A, Kokoszka A. *Decreasing self-reported cognitive biases and increasing clinical insight through meta-cognitive training in patients with chronic schizophrenia*. J. Behav. Ther. Exp. Psychiatry 2015; 48: 98–104.

52. Lam KCK, Ho CPS, Wa JC, Chan SMY, Yam KKN, Yeung OSF. et al. *Metacognitive training (MCT) for schizophrenia improves cognitive insight: A randomized controlled trial in a Chinese sample with schizophrenia spectrum disorders*. Behav. Res. Ther. 2015; 64: 38–42.

53. Favrod, J, Rexhaj S, Bardy S, Ferrari P, Hayoz C, Moritz S. et al. *Sustained antipsychotic effect of metacognitive training in psychosis: A randomized-controlled study*. Eur. Psychiatry 2014; 29(5): 275–281.

54. Kuokkanen R, Lappalainen R, Repo-Tiihonen E, Tiihonen J. *Metacognitive group training for forensic and dangerous non-forensic patients with schizophrenia: A randomised controlled feasibility trial*. Crim. Behav. Ment. Health 2014; 24(4): 345–357.

55. van Oosterhout B, Krabbendam L, de Boer K, Ferwerda J, van der Helm M, Stant AD. et al. *Metacognitive group training for schizophrenia spectrum patients with delusions: a randomized controlled trial*. Psychol. Med. 2014; 44(14): 3025–3035.

56. Moritz S, Veckenstedt R, Bohn F, Hottenrott B, Scheu F, Randjbar S. et al. *Complementary group Metacognitive Training (MCT) reduces delusional ideation in schizophrenia*. Schizophr. Res. 2013; 151: 61–69.

57. Moritz S, Veckenstedt R, Andreou C, Bohn F, Hottenrott B, Leighton. et al. *Sustained and "sleeper" effects of group metacognitive training for schizophrenia: a randomized clinical trial*. JAMA Psychiatry 2014; 71(10): 1103–1111.

58. Naughton M, Nulty A, Abidin Z, Davoren M, O'Dwyer S, Kennedy HG. *Effects of group metacognitive training (MCT) on mental capacity and functioning in patients with psychosis in a secure forensic psychiatric hospital: a prospective-cohort waiting list controlled study*. BMC Res. Notes 2012; 5: 302.

59. Rocha NBF, Queirós C. *Metacognitive and social cognition training (MSCT) in schizophrenia: A preliminary efficacy study*. Schizophr. Res. 2013; 150: 64–68.

60. Erawati E, Keliat BA, Helena N, Hamid A. *The influence of metacognitive training on delusion severity and metacognitive ability in schizophrenia*. J. Psychiatr. Ment. Health Nurs. 2014; 21(9): 841–847.

61. Moritz S, Veckenstedt R, Randjbar S, Vitzthum F, Woodward TS. *Antipsychotic treatment beyond antipsychotics: metacognitive intervention for schizophrenia patients improves delusional symptoms*. Psychol. Med. 2011; 41(9): 1823–1832.

62. Ochoa S, Haro JM, Huerta-Ramos E, Cuevas-Esteban J, Stephan-Otto C, Usall J. et al. *Relation between jumping to conclusions and cognitive functioning in people with schizophrenia in contrast with healthy participants*. Schizophr. Res. 2014; 159(1): 211–217.

63. Saravanan B, Jacob KS, Johnson S, Prince M, Bhugra D, David AS. *Assessing insight in schizophrenia: East meets West*. Br. J. Psychiatry 2007; 190(3): 243–247.

64. Leśniak W, Bała M, Mrukowicz J, Brożek J, Jaeschke R, Gajewski P. *Przegląd systematyczny i metaanaliza*. In: Gajewski P, Jaeschke R, Brożek J. ed. *Podstawy EBM, czyli medycyny opartej na danych naukowych dla lekarzy i studentów medycyny*. Krakow: Practical Medicine Publishing House; 2008. p. 111–126.

65. Morrison AP, French P, Walford L, Lewis SW, Kilcommons A, Green J. et al. *Cognitive therapy for the prevention of psychosis in people at ultra-high risk: randomised controlled trial*. Br. J. Psychiatry 2004; 185: 291–297.

Address: Łukasz Gawęda
II Department of Psychiatry
Medical University of Warsaw
02-242 Warszawa, Kondratowicza Street 8