



Metacognitive Training (MCT-Silver) for Older Adults with Depressive Symptoms in Portugal: A Pilot Study

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Abstract

Purpose Depressive symptoms in older adults represent a significant concern with major life impact. This uncontrolled pilot study evaluated the safety, feasibility and acceptance of metacognitive training for depression in later life (MCT-Silver) among Portuguese older adults. MCT-Silver is an 8-week psychological group intervention targeting (meta)cognitive beliefs to reduce depressive symptoms. The study also assessed changes in depressive symptoms, metacognitive beliefs, quality of life, ruminative responses, self-esteem, and dysfunctional attitudes.

Methods A pilot, uncontrolled, single-group study with twenty-nine participants aged ≥ 60 years without cognitive impairment and beck depression inventory-II (BDI-II) scores ≥ 14 were included. Blinded assessments occurred at baseline and post-intervention using patient health questionnaire-9 (PHQ-9) (depression), metacognitions questionnaire-30 (MCQ-30) (metacognitive beliefs), world health organization quality of life instruments-Bref, item 1 (WHOQOL-Bref) (quality of life), ruminative responses scale (RRS-10) (ruminative responses), Rosenberg self-esteem scale (RSE) (self-esteem), and dysfunctional attitudes scale-18B (DAS-18B) (dysfunctional attitudes). Acceptance was assessed with a 21-item questionnaire.

Results Participants attended an average of 6 sessions (75%) and evaluated the intervention very positively, indicating they found it to be useful in daily life and fun. We did not receive any negative responses. Pre-post comparisons showed statistically significant changes in depressive symptoms, metacognitive beliefs, quality of life, rumination, self-esteem and dysfunctional attitudes; however, given the uncontrolled design, these findings should be interpreted as preliminary and exploratory rather than as evidence of efficacy.

Conclusions Results of this uncontrolled single-group pilot study are encouraging, indicating safety, and feasibility of administration as well as high adherence and acceptance among Portuguese older adults. Given the uncontrolled single-group design, the observed pre-post improvements in clinical outcomes should not be interpreted as evidence of efficacy. Controlled studies are needed to confirm the efficacy of MCT-Silver in this population.

Keywords Depression · Older adults · Metacognitive training · Pilot study · Portugal

Introduction

According to the World Health Organisation, depression is a common mental disorder that affects around 280 million people worldwide. This represents an estimated 10.4% of adults, including 5.7% of those over age 60 (World Health Organization, 2021). During the pandemic period, the prevalence of depression increased worldwide and has remained elevated during the post-pandemic period, with reported

prevalences between 31 and 63% (Briciu et al., 2023; Duan et al., 2022; Martínez-Líbano et al., 2023; Shanbehzadeh et al., 2021; Silva et al., 2024a, 2024b).

A recent post-pandemic study, using data from the International Classification of Primary Health Care (ICPC-2) as of December 31, 2022, analysed a population of 556,332 inhabitants of Portugal. There were 69,215 cases of depressive disorder, corresponding to a prevalence of 12.4%. 78.5% of cases were female, and 75.0% were 40 years of

Extended author information available on the last page of the article

age or older. The study's discussion highlights that, in men, depressive disorder may be underdiagnosed (Santiago et al., 2025).

Depression is one of the main causes of years lived with disability (James et al., 2018; Santomauro et al., 2021) and can result in great suffering due to impaired functionality (World Health Organisation, 2023) due to social and cognitive dysfunctions. Depression in later life is also linked to dementia (Wu et al., 2020). As such, timely intervention is essential to minimize or prevent depression-associated dysfunction and improve quality of life in this population (Pinho et al., 2021; Schneider et al., 2018). In addition, depression in older adults is characterised by a higher relapse rate, as well as higher suicide rates, especially among the oldest old (Jeong et al., 2024; Shah et al., 2016).

Depressive symptoms have a particularly detrimental impact on cognition and the ability to perform instrumental activities of daily living (IADLs) in older adults. Depression is associated with impairments in attention, memory, executive functions, and processing speed, all essential for maintaining independence in daily tasks such as managing finances, using transportation, or administering medication (Giannouli & Tsolaki, 2021). Research also indicates that comorbid depression significantly impairs cognitive functioning and financial capacity, even in the context of mild cognitive impairment, highlighting the cumulative impact when both conditions coexist (Giannouli & Tsolaki, 2021). Longitudinal evidence confirms that depression plays a detrimental role in cognitive performance over time in older adults with amnesic mild cognitive impairment (AMCI), reinforcing the urgency of early and targeted interventions (Giannouli et al., 2022). It is important to note that the impact of depressive symptoms on ADLs (activities of daily living) is not uniform across populations and may vary according to cultural context, educational level, and socioeconomic factors (Giannouli et al., 2022). These aspects reinforce the need to intervene in depressive symptoms.

Metacognitive training for depression (D-MCT) is a group intervention based on metacognitive and cognitive-behavioural approaches, developed to address dysfunctional thought and behaviour patterns that contribute to the onset and maintenance of depression. Metacognitive training for older adults with depression (MCT-Silver) represents an adapted version of D-MCT specifically developed for older adults (≥ 60 years), incorporating content and examples appropriate to the experiences and challenges of this age group (Schneider et al., 2018, 2024).

MCT-Silver is a group intervention, which utilizes metacognitive and cognitive-behavioural approaches to address unhelpful thought and behavioural patterns that purportedly contribute to the onset and maintenance of depression.

Materials for the intervention are provided at no cost.¹ In line with the forerunner metacognitive training program for psychosis (Moritz & Woodward, 2007), the main aim of MCT-Silver is to reduce depressive symptoms through changing the purported underlying (meta)cognitive beliefs (Schneider et al., 2024). Moreover, due the highly structured format, the intervention can be administered by mental health personal without extensive psychotherapy training.

Two studies on MCT-Silver have been conducted in psychiatric settings. A pilot study was conducted to assess the feasibility, acceptability and effects of D-MCT as an add-on intervention among a group of older adults (ages 55 and older) undergoing day treatment or inpatient psychiatric treatment. The results of this uncontrolled pilot study indicated a significant reduction in symptoms of depression and cognitive distortions. These results provided initial support for the feasibility and acceptance of D-MCT among older adults with depression (Schneider et al., 2018). Subsequently, a randomised clinical trial was carried out in Germany, which compared MCT-Silver against an active control group, demonstrating a significantly greater reduction in self-reported depressive symptoms in the MCT-Silver group (Cohen's $d=0.46$; Schneider et al., 2024).

The main aim of MCT-Silver is to increase patients' ability to reflect upon their cognitive processes, as well as to identify and correct dysfunctional behavioural and thinking patterns, with the ultimate goal of reducing depressive symptoms (Moritz et al., 2018; Schneider et al., 2018, 2024). This is achieved by providing specific modules in the group intervention, which target maladaptive emotion regulation strategies (e.g. thought suppression, rumination) and metacognitive beliefs (e.g. belief that rumination helps with problem-solving, emotion-congruent memory). Moreover, MCT-Silver targets psychological reactions to challenges associated with aging and the risk factors associated with depression in older people, such as social isolation, physical disabilities and interpersonal losses (Schneider et al., 2018, 2024).

MCT-Silver has not yet been validated for the Portuguese population and studies are needed to examine its safety, acceptance, and feasibility and to obtain preliminary estimates of its potential effects in older adults in Portugal.

The positive and promising results of studies conducted in Germany indicate that the intervention has significant potential (Schneider et al., 2018, 2024). A significant percentage of older adults experience clinically-relevant depressive symptoms, and the prevalence of depressive symptoms has not decreased after the pandemic (Silva et al., 2024a, 2024b). As such, there is a need for depression treatment specifically for older adults in Portugal; however, few

¹ www.ukc.de/mct-silver

life-phase-specific interventions are available and the majority of older adults with depression go untreated. As such, we conducted an uncontrolled pilot study of MCT-Silver in the Portuguese population, evaluating the feasibility and acceptance of the intervention among Portuguese older adults in primary care and to ascertain possible effects of MCT-Silver on depressive symptoms, metacognitive beliefs, perceived quality of life, ruminative responses, self-esteem and dysfunctional attitudes. The results of this pilot study will enable the existing randomized controlled trial (RCT) protocol to be informed and refined.

This pilot study had four main objectives: (1) to assess the feasibility of implementing MCT-Silver in the Portuguese population treated in primary care; (2) to assess the acceptability of MCT-Silver among older Portuguese adults through quantitative satisfaction ratings and qualitative feedback; (3) to examine the safety of and adverse effects associated with MCT-Silver, and (4) to obtain preliminary estimates of efficacy by examining changes in depressive symptoms (primary outcome), metacognitive beliefs, quality of life, ruminative responses, self-esteem, and dysfunctional attitudes (secondary outcomes) from baseline to post-intervention.

It should be noted from the outset that, given the uncontrolled single-group design, outcome data must be interpreted as preliminary and exploratory, and do not permit causal inferences regarding the efficacy of MCT-Silver.

Materials and Methods

Study Design

This was a single-group, uncontrolled pilot study with pre- and post-intervention assessments, designed to evaluate the feasibility, acceptability, and preliminary outcomes of MCT-Silver in Portuguese older adults.

The decision not to include a control group was deliberate and consistent with the recommended methodology for early-phase pilot studies (Hertzog, 2008; Lewis et al., 2021). At this stage, the main objectives were to assess feasibility, acceptability, and safety, objectives that do not require a comparative condition. The inclusion of a control group was not considered necessary, as this pilot study was designed as a precursor to a future randomized controlled trial (RCT). Furthermore, this approach reflects the development trajectory of the MCT-Silver in Germany, where an initial uncontrolled pilot study (Schneider et al., 2018) preceded the subsequent RCT (Schneider et al., 2024). In line with this two-stage model, the present study was designed to generate preliminary data to guide the design, sample size calculations, and procedural refinements of the future

Portuguese RCT, which will include an appropriate control condition.

No statistical software (such as G*Power) was used to estimate sample size based on statistical power, as formal power calculations are not necessary for early-stage uncontrolled pilot and feasibility studies. Instead, the sample size was determined a priori based on established methodological recommendations for pilot studies (Hertzog, 2008; Lewis et al., 2021), which suggest that a sample size between 15 and 35 participants is fully adequate to generate robust estimates of feasibility, safety, and operational parameters.

A formal consultation was requested from the Ethics Committee of the University of Évora, which gave a positive decision under code no. 22073. Authorisation was also sought from the various institutions where the studies were carried out. The involvement of individuals in research projects and the objectives thereof were explained to participants, who subsequently provided informed consent. Participants' privacy was meticulously preserved throughout the entire research process. All ethical standards derived from the 1964 Declaration of Helsinki and its subsequent revisions were strictly adhered to ("World Medical Association Declaration of Helsinki," 2013).

Previous Procedures

The study protocol for a future randomised controlled trial has been registered on the platform "ClinicalTrials.gov".² The study protocol was published and all details not referred to in this article can be found in the study protocol article (Pinho et al., 2023). The study protocol identifier code for a future randomised controlled trial on this platform is "NCT05640492".³ This pilot study was planned in the first phase of the series of studies within the clinical trial protocol registered for the future RCT.

This pilot study presents some methodological differences from the published protocol (Pinho et al., 2023), which are justified by the exploratory nature of this phase. Specifically: (1) we used more inclusive age criteria (≥ 60 vs. ≥ 65 years) to maximise recruitment and maintain consistency with previous international studies; (2) we adopted the BDI-II as an inclusion criterion because it is more practical for screening; in addition, the BDI-II is the most widely used and validated self-report instrument when compared to the Montgomery-Asberg Depression Rating Scale (MADRS). The BDI-II is considered a cost-effective questionnaire for measuring the severity of depression, with broad applicability for research and clinical practice worldwide (Wang & Gorenstein, 2013). Both instruments detect

² <https://classic.clinicaltrials.gov/ct2/home>

³ <https://classic.clinicaltrials.gov/ct2/show/NCT05640492>

mild depression, maintaining the equivalence of the severity criterion. (3) We adjusted the Mini Mental State Examination cut-off points to educational attainment, according to Portuguese validation (Folstein et al., 1975); (4) We implemented an uncontrolled design, appropriate for assessing feasibility and acceptance prior to the RCT; (5) We did not include a 3-month follow-up to reduce attrition and burden on participants at this early stage. These adaptations are consistent with methodological recommendations for pilot studies (Hertzog, 2008; Lewis et al., 2021).

Participant Selection Process

Our study took place between June and August 2025. Participants were randomly selected from healthcare institutions in Portugal by mental health professionals, using a probabilistic method in which numbers were assigned to participants, written on pieces of paper of identical size and weight, placed in a container, mixed well, and removed one by one until the sample was complete. Eligible individuals were recruited from all the institutions that agreed to authorise the study in Portugal (Alto Alentejo Local Health Unit, Central Alentejo Local Health Unit, and Baixo Alentejo Local Health Unit), via telephone contact, facilitated by researchers working alongside the multidisciplinary team.

Although a probabilistic allocation was used among individuals already registered in these specific units, the sample cannot be considered fully representative of the general population of older Portuguese adults with depressive symptoms.

The eligible population consisted of adults aged ≥ 60 years, without cognitive impairment and with a BDI-II score ≥ 14 , registered as patients at the participating healthcare institutions.

Of the 39 individuals approached across the three health units, two refused to participate and one participant was excluded during screening due to an MMSE score below

the educational level-adjusted threshold, indicating cognitive impairment. Thus, 36 (92.3%) agreed to participate and met the eligibility criteria. Of these 36, two did not attend for unknown reasons and five attended but subsequently withdrew for unknown reasons. 29 (80.5%) completed the intervention and post-intervention assessment and were included in the final analysis.

After all the participants had given their informed consent, a baseline assessment (T0), including all instruments, was completed. All individuals who consented to participate in the study were assigned a numerical identifier to ensure the preservation of their confidentiality. The participants were re-evaluated at the end of the intervention, using all planned instruments. The evaluation instruments were applied by the same evaluator before and after the intervention, in person (Table 1. Study timetable).

Inclusion and Exclusion Criteria

The Inclusion criteria: participants aged 60 years or older; score ≥ 14 on the Beck Depression Inventory-II (BDI-II), indicative of mild depression (Beck et al. 1966), ability to provide informed consent; adequate command of the Portuguese language; and availability to participate in the intervention throughout the study period, and a Mini Mental State Examination (MMSE) score at or above the educational level-adjusted cut-off point (i.e., absence of cognitive impairment as defined by (Guerreiro et al., 1994).

Exclusion criteria: Lifetime history of psychotic symptoms, such as delusions and hallucinations, along with current or previous episodes of mania, current suicidal ideation and the presence of dementia or other neurological conditions that can trigger depressive symptoms (e.g. Parkinson's disease or multiple sclerosis), as well as ongoing substance dependence (with tolerance to substance misuse), individuals who have taken part in similar sessions in the last 3 months, and individuals with a Mini Mental State Examination

Table 1 Study timetable

	Study period			
	Selection of participants	Application of the instruments	Intervention (8 weekly sessions)	Post-intervention (8 weeks)
Moment	T -1	T 0		T 1
<i>Selection of participants</i>				
Verification of eligibility	X			
Informed consent		X		
Intervention MCT-Silver			X	
<i>Application of the instruments</i>				
Baseline		X		
Post-intervention				X
Questionnaire on acceptability and satisfaction with the intervention				X

(MMSE) score below the cut-off points adjusted for educational level [i.e., <15 for illiterate participants; <22 for participants with 1–11 years of schooling; <27 for participants with more than 11 years of schooling (Guerreiro et al., 1994)].

Quality Control Measures

To ensure the quality and methodological rigor of the study, the following quality control measures were implemented:

Training of professionals: All mental health professionals who applied the MCT-Silver received specific prior training on the application of the intervention, ensuring standardization in the implementation of the eight modules. The training was in Metacognitive Training and was given at the University of Évora by Professor Lara Pinho, coordinator of the study in Portugal, in conjunction with the Department of Psychiatry and Psychotherapy of the University Medical Center Hamburg-Eppendorf, in Germany; **Fidelity to the intervention:** The application of the MCT-Silver rigorously followed the structured manual, with standardized multimedia materials for all sessions. Professionals used the official materials made available free of charge, ensuring consistency in the presentation of content among the different groups; **Data control:** A numerical coding system was used to ensure the confidentiality of the participants; **Safety monitoring:** As described in Sect. “[Implications for Clinical Practice and Research](#)”, systematic monitoring of the participants’ well-being was carried out in each session, with particular attention to possible worsening of depressive symptoms or emergence of suicidal ideation; **Adherence:** Strict records of participant attendance at each session were maintained, allowing for the calculation of adherence rates and the identification of potential barriers to participation.

Study Intervention—Metacognitive Training for Depression in Older Adults (MCT-Silver)

The development of metacognitive training (MCT) dates back to 2003, when it was initially designed for patients with psychosis (Moritz et al., 2013). Subsequently, this intervention was progressively adapted and expanded to other psychological disorders,⁴ including D-MCT (Jelinek et al., 2015; Moritz et al., 2013) and MCT-Silver (Schneider et al., 2018, 2024). In the Portuguese translation of MCT-Silver, some terms have been adjusted; however, the case examples, exercises and general content have been retained to ensure consistency across countries. In addition, the intervention and its examples can be adapted by trainers to

the specific needs of each group, for example by reducing the length of sessions or tailoring the content to the issues raised by participants. All material and information relating to MCT-Silver is available free of charge in English, German, Spanish, Japanese and Portuguese.⁵

MCT-Silver comprises a total of eight sessions, organised into modules, which address common cognitive distortions, unhelpful behaviours, metacognitive beliefs an information processing.

All the content is supported by studies associating these processes with depression, although few of the studies on the purported underlying processes contributing to depression (e.g., dysfunctional attitudes or metacognitive beliefs) have been either specifically or adequately examined in older adults.

The MCT-Silver sessions are as follows (Table 2. Description of the content of the MCT-Silver modules):

Module 1: Thinking and Reasoning I—Mental filter and overgeneralisation (Mathews & MacLeod, 2005; Moritz et al., 2008);

Module 2: Memory—Mood-congruent memory/false memories (Mathews & MacLeod, 2005; Moritz et al., 2008);

Module 3: Thinking and Reasoning II—‘Should’ statements (Egan et al., 2011; McGrath et al., 2012) and disqualification of the positive (Cane & Gotlib, 1985; Elliott et al., 1997), as well as fostering acceptance of negative feelings (Hayes et al., 1996; J. Butler & Ciarrochi, 2007);

Module 4: Values (Hayes et al., 2006; Isaacowitz & Seligman, 2002; Wrosch et al., 2013);

Module 5: Thinking and Reasoning III—Exaggeration/Minimisation (Cane & Gotlib, 1985; Garber & Hollon, 1980; Hoehn-Hyde et al., 1982; Wenzlaff & Grozier, 1988) as well as Depressive Attribution Style (Carver & Ganellen, 1983; Wenzlaff & Grozier, 1988);

Module 6: Behaviours and Strategies—Ruminations and Thought Suppression (Rood et al., 2009; Seidel et al., 2010; Wells, 2011);

Module 7: Thinking and Reasoning IV—Jumping to conclusions (Miranda et al., 2008; Strunk et al., 2006);

Module 8: Self-esteem (Davey et al., 2004; Holmes et al., 2016; Orth et al., 2009).

The MCT-Silver modules last 45–60 min and are administered through a multimedia presentation with interactive exercises, in which knowledge about cognitive distortions is conveyed, promoting critical reflection among participants, modifying the content of their thoughts, and acquiring new

⁴ https://clinical-neuropsychology.de/metacognitive_training/

⁵ <https://clinical-neuropsychology.de/metacognitive-training-for-depression-mct-silver/>

Table 2 Description of the content of the MCT-Silver modules

Module	Name	Cognitive bias/Behaviour	Objectives	Example in MCT-Silver
1	Thinking and Reasoning I	Mental filter, overgeneralisation	Identifying and modifying selective perception (i.e. the mental filter) and exaggerated generalisations of negative experiences	Modifying the overgeneralisation of negative experiences: Examples of situations with possible depressive interpretations are presented More balanced interpretations of these depressive interpretations are identified
2	Memory	Mood-congruent memory/false memories	Normalising and explaining concentration and memory problems in depression Increase awareness of memory biases	False memory effect: Participants are asked to recall objects shown in a picture. They are then given a list of words and asked to identify the incorrect objects, which were not shown
3	Thinking and Reasoning II	'Should' statements and disqualification of the positive 'All-or-nothing' thinking, acceptance of negative feelings related to life changes	Encourage participants to question rigid and perfectionist behaviour Introduce the concept of creating acceptance of negative feelings	Examining perfectionist standards: The advantages and disadvantages of holding ourselves to certain (high) standards are discussed (e.g. always having a perfectly clean house) Acceptance: Identifying areas of life where participants would like to practice more acceptance for negative feelings
4	Values	Identify values and strategies for living a life based on values	Identify personal values	Values: Communication on the importance of improving the perception of personal values Discussion of strategies that can support a values-orientated life
5	Thinking and Reasoning III	Exaggeration/minimization as well as depressive attribution style	Identify and modify prejudices when judging the extent and consequences of perceived successes and failures	One-sided attributions: Examples of unilateral attributions are presented, and participants are encouraged to identify multiple causes for an outcome
6	Behaviours and Strategies	Dysfunctional coping strategies: ruminations and thought suppression	Reduce rumination associated with negative or catastrophic thoughts about the past/future Develop new useful behaviours to deal with situations	Useful coping strategies: Mindfulness exercise to practise inner detachment
7	Thinking and Reasoning IV	Jumping to conclusions, reading minds, guessing the future (catastrophising)	Identify cases in which hasty conclusions are drawn Encourage consideration of multiple sources of information before reaching a conclusion	Consideration of alternative information: Charts are shown and participants are asked to guess the correct title from a list of choices
8	Self-esteem	Self-esteem, changing negative self-perceptions of aging through images	Communicate strategies to improve self-esteem Reduce and modify unfair comparisons (for example, with the younger self)	Imagination exercise: Transforming negative images into strong, positive ones (for example, transforming a weak, nervous chick into a proud eagle)

strategies for solving everyday problems (Jelinek et al., 2022; Schneider et al., 2018, 2024).

The MCT-Silver was administered by mental health professionals who had previously participated in specific training on how to administer the MCT-Silver (as mentioned above), with experience of providing care to patients with depression. The MCT-Silver sessions were applied to the group once a week, for a total of eight sessions (eight weeks), face-to-face, in a quiet room at the institution to which the group belongs. MCT-Silver is a group intervention, with groups of around ten participants, exclusively for individuals aged 60 or over with depressive symptoms.

Outcomes

Data were collected at the beginning of the study, before the start of MCT-Silver, through interviews, and again at the end of the 8-week intervention. Sociodemographic and clinical data were only collected once before the start of MCT-Silver. The questionnaire 'Questionnaire on acceptability and satisfaction with the intervention' was collected at the end of the intervention and session attendance was carefully tracked (Table 3. List of instruments and time of application).

Table 3 List of instruments and time of application

Instruments	Baseline	8 weeks (post-intervention)
Mini mental state examination (MMSE)	X	
Beck depression inventory—II (BDI-II)	X	X
Patient health questionnaire (PHQ-9)	X	X
Metacognitions questionnaire (MCQ-30)	X	X
WHOQOL-BREF Item 1	X	X
Ruminative responses scale (ERR-10)	X	X
Rosenberg self-esteem scale (RSE)	X	X
Dysfunctional attitudes scale-18B (DAS-18B)-Portuguese version	X	X
Questionnaire on acceptability and satisfaction with the intervention		X

Socio-Demographic Questionnaire

The sociodemographic questionnaire included information about the study participants, such as gender, age (years), employment status, marital status, schooling, ‘person they live with’ and some clinical data.

Mini Mental State Examination (MMSE)

The MMSE developed by Folstein et al. (1975) was used to screen for possible cognitive deficits, with the aim of excluding participants with cognitive deficits according to the instrument’s cut-off points. Higher scores indicate better cognitive ability. The MMSE was adapted for the Portuguese population by Guerreiro et al. (1994). The presence of cognitive impairment is assessed according to educational qualifications (level of schooling).

The MMSE consists of 30 items and is structured into seven cognitive domains: Temporal Orientation, Spatial Orientation, Retention or Immediate Memory, Attention and Calculation, Recall or Short-Term Memory, Language, and Visual-Spatial Ability/Constructive Praxis.

The total score ranges from 0 to 30 points, with higher scores indicating better cognitive performance. The cut-off points for identifying cognitive impairment should be adjusted according to the educational level of the population being assessed. Cognitive impairment is: ‘Did not attend school and cannot read or write’ or ‘Did not attend school but can read and write’ with a score < 15 points; from 1 to 11 years of schooling with a score < 22 points; and with more than 11 years of schooling with a score < 27. A better score indicates better cognitive ability. It is a hetero-administration instrument (Folstein et al., 1975).

Questionnaire on Acceptability and Satisfaction with the Intervention

In patient-centred interventions, an assessment of acceptability and satisfaction with the treatment and/or care provided should be carried out (Pinho et al., 2021). To this end, we used the instrument ‘Questionnaire on acceptability and satisfaction with the intervention’, which was applied after the 8-week intervention period.

This instrument consists of 21 items using a self-designed subjective evaluation scale. Participants read a set of 18 statements and mark their answers on a five-point Likert scale, ranging from 1 ‘Strongly agree’ to 5 ‘Strongly disagree’, for example: ‘I found the Metacognitive Training programme useful and important’ and ‘By using the Training programme, I understand my illness better’. To interpret the answers ticked, both positive ratings (‘I totally agree’ and ‘I agree’) are combined for positively worded items and vice versa for reversed items. This instrument also has three open response items such as ‘I particularly liked’, for example: ‘The availability of the professionals’ and ‘The good atmosphere in the sessions.’

Of the 18 closed items, 14 are positively worded (e.g., ‘I found the Metacognitive Training programme useful and important’; ‘I enjoyed the programme’; ‘I felt in good hands with the therapists in the Training programme’) and four are negatively worded, serving as reversed items to detect response bias (items 2, 8, 9, and 13: e.g., ‘I had to force myself to take part in the programme regularly’; ‘My thinking now seems more confused/disorganised’; ‘Using the programme worsened my mood/depression’; ‘The content of the Training programme overlapped with other treatment options’). For reversed items, agreement indicates a negative evaluation; therefore, the combined proportion of ‘Strongly disagree’ and ‘Disagree’ responses is reported as the indicator of a positive evaluation. The questionnaire was adapted from the acceptability evaluation tool used in the original German MCT-Silver studies (Schneider et al., 2018, 2024) and translated into Portuguese for the purposes of this pilot study. It has not undergone formal psychometric validation, which constitutes a recognized limitation in the limitations section.

Analysing the responses to this instrument was useful in understanding the acceptability and satisfaction of the participants in the study (Pinho et al., 2023). This instrument was collected at the end of the intervention.

Beck Depression Inventory-II (BDI-II)

This instrument was developed by Beck, Ward, Mendelson, Mock, & Erbaugh (Beck, 1961), and is a self-administered instrument. This instrument was adapted for the Portuguese

population by Martins, Coelho, Ramos and Barros (Martins et al., 2000).

The psychometric qualities of the BDI-II show adequate levels of internal consistency, considered by some authors to be ‘excellent’ (Cronbach’s $\alpha=0.91$), and high test–retest reliability ($r=0.93$; $p<0.001$) (Martins et al., 2000). This instrument aims to distinguish between depressed and non-depressed individuals, as well as to measure the severity of depressive symptoms. It consists of 21 items grouped into three factors: 1—Cognitive Factor ($n=8$); 2—Affective Factor ($n=6$); and 3—Somatic Factor ($n=7$). There are four response options for each item (except for items 16 and 18, for which there are seven response options). The severity of the symptoms in the last two weeks is rated on a four-point Likert scale (e.g. sadness, 0—I don’t feel sad; 3—I’m so sad or unhappy that I can’t stand it anymore) (Araújo, 2011). Scores less than or equal to 13 indicate minimal symptomatology; between 14 and 19 mild depression; 20 to 28 moderate depression; and 29 to 63 severe depression (Beck et al., 1966a, 1966b).

Patient Health Questionnaire-9 (PHQ-9)

The PHQ-9 was developed by Kroenke et al. (2001) with the aim of assessing the presence of depressive symptoms. The PHQ-9 was adapted for the Portuguese population by Monteiro et al. and has satisfactory internal consistency (Cronbach’s $\alpha=0.86$) and strong convergent validity with the BDI ($r=0.85$; $p<0.01$) (Monteiro et al., 2013).

This instrument consists of nine items that assess the severity of symptoms associated with depression on a 4-point Likert scale (from 0 ‘Never’ to 3 ‘Almost every day’). The summed scores range from 0 to 27. Scores between 0 and 4 indicate minimal depression, scores between 5 and 9 indicate mild depression, scores between 10 and 14 indicate moderate depression, scores between 15 and 19 indicate moderately severe depression, and scores between 20 and 27 indicate severe depression (Kroenke et al., 2001).

Metacognitions Questionnaire-30 (MCQ-30)

The MCQ-30 was developed by Wells and Cartwright-Hatton (2004) with the aim of assessing metacognitive beliefs in five subscales: cognitive confidence, positive beliefs about worry, cognitive self-awareness, negative beliefs about the uncontrollability of thoughts and danger, and beliefs about the need to control thoughts. The MCQ-30 was adapted for the Portuguese population by Dinis and Gouveia (2011) and has good internal consistency (Cronbach’s $\alpha=0.91$). In our study we only used three subscales of the MCQ-30: (1) positive beliefs about worry (6 items); (2) negative beliefs about the uncontrollability of thoughts and danger (6 items)

and (3) beliefs about the need to control thoughts (6 items), because they are more closely associated with depression (Ruiz & Odriozola-González, 2015) and the other two subscales are not related to the concepts of metacognitive training (Jelinek et al., 2013, 2017a, 2017b). The subscales of the original version of the QMC-30 show good internal consistency and a factorial structure that is consistent with that of the original scale (Dinis & Gouveia, 2011).

WHOQOL-BREF Item 1

O WHOQOL-Bref (world health organization quality of life instruments-Bref) was developed by the World Health Organisation in 1998 (The Whoqol Group, 1998), and was adapted for the Portuguese population by Vaz Serra et al. (Vaz Serra et al., 2006). The WHOQOL-BREF has a global item called ‘How would you rate your quality of life?’, and it is this item that we used in our study, since our choice was for the participants to give us an overall assessment of their quality of life.

Ruminative Responses Scale (RRS-10)

The ERR-10 is a shortened version of 10 items developed by Treynor et al. (2003) from Response Styles Questionnaire (Nolen-Hoeksema & Morrow, 1991), which was adapted for the Portuguese population by Dinis et al. (Dinis et al., 2011). The ERR-10 assesses ruminative responses. This instrument has 10 items, and two factors have been identified. The ‘reflective’ factor and the ‘brooding’ factor. The ‘reflective’ factor refers to attempts to understand the reasons for depressed mood (Cronbach’s $\alpha=0.75$), and the ‘brooding’ factor refers to perseverative thinking focused on the negative consequences of depressed mood and obstacles to problem-solving (Cronbach’s $\alpha=0.76$). Participants read a set of 10 statements referring to ‘what they usually do when they feel sad, depressed or down’ and ticked the answers on a four-point Likert scale, ranging from 1 (‘almost never’) to 4 (‘almost always’) (Dinis et al., 2011).

Rosenberg Self-Esteem Scale (RSE)

The RSE was developed by Morris Rosenberg (1965) with the aim of assessing self-esteem with 10 items associated with self-confidence and self-deprecation, and was adapted for the Portuguese population by Santos and Maia (2003) with a Cronbach’s $\alpha=0.86$. Participants read a set of 10 statements and marked their answers on a four-point Likert scale, ranging from 1 ‘Strongly Agree’ to 4 ‘Strongly Disagree’. A high score indicates positive feelings that the individual has about themselves, leading to self-respect and the realisation that they are capable, without the feeling of

superiority. A low score indicates low self-esteem, which implies self-rejection, dissatisfaction and contempt for one-self (Santos & Maia, 2003).

Dysfunctional Attitudes Scale-18B (DAS-18B)-Portuguese Version

The dysfunctional attitudes scale is a self-report questionnaire designed to assess and identify dysfunctional attitudes and thoughts associated with depressive symptoms and depression, and has a total of 18 items (Rojas et al., 2015, 2022). The DAS-18B represents a shorted version of the original DAS (Rojas et al., 2015, 2022). The original scaling was maintained so that items are answered on a seven-point Likert scale (1 = totally agree and 7 = totally disagree). A higher total score indicates a greater presence of dysfunctional attitudes. The total score can vary between 18 and 126 (Rojas et al., 2015, 2022). This instrument assesses two dimensions: attitudes towards “performance evaluation” (8 items) and attitudes towards “recognition by others” (3 items). Seven items were not assigned to any factor and are not included in the subscales, as in the original scale (Silva et al., 2024a, 2024b).

In the present study we used a version of the DAS-18B, whose 18 items had already been translated into Portuguese in the validation study of the 40-item DAS for the Portuguese population by Gouveia (Gouveia, 1990).

Statistical Analyses

Statistical analysis was performed using SPSS [Version: 29.0.0.0 (241)]. Data were described as counts and proportions for categorical variables, and as means with minimum and maximum values for normally distributed continuous variables. For the dimensions of the scales that followed a normal distribution, as determined by the Shapiro–Wilk test, paired sample *t*-tests were conducted to compare scores between the two time points. However, for the Somatic and Total scores of the BDI scale, the Negative Beliefs, Uncontrollability, and Total scores of the MCQ-30 scale, the overall WHOQOL-BREF score, and all dimensions of the DAS-18B, which did not meet the assumption of normality, the non-parametric Wilcoxon signed-rank test was applied. To assess changes in depressive symptoms according to participation in the sessions conducted, an ANCOVA was performed for both the BDI (dimensions and total score) and the PHQ-9 scales.

To further explore the relationship between intervention exposure and changes in depressive symptoms, an exploratory simple linear regression analysis was performed. The change scores (baseline minus post-intervention scores) of depressive symptoms were entered as dependent variables,

and total participation in MCT-Silver sessions was entered as the independent variable.

Results

This pilot study included a total of 29 participants, as a minimum of 15 to 20 participants is essential to guarantee the scientific validity of the pilot study results (Hertzog, 2008), with 26 to 34 participants guaranteeing more robust results (Lewis et al., 2021). Figure 1 shows the flow of participants during the study (Fig. 1. Flow of participants during the study). The 29 participants were distributed as follows: 10 at the Alto Alentejo Local Health Unit, 10 at the Central Alentejo Local Health Unit, and 9 at the Baixo Alentejo Local Health Unit. The intervention was administered by local teams from the Health Units.

Sociodemographic and Clinical Characteristics of the Sample

The sociodemographic characteristics of the study participants are described in Table 4. Most of the participants were female and had an average age of 69 (SD=5.8) years (Range 60 to 81 years). More than half of the participants were married or living together (58.6%), around 25% were widowed, 10.3% were divorced or separated and 6.9% were single. Most (79.3%) had completed basic education, and 20.7% had completed higher education. Most participants were retired due to age (51.7%) or disability (27.6%), 10.3% were employed, 6.9% unemployed and 3.4% on sick leave. Approximately 60% of the sample lived with their spouse or partner (62.1%), but 31 per cent lived alone. Only 17.2 per cent reported having no diagnosed illness and 10.3 per cent reported smoking.

Figure 2 shows the consultations or programmes attended by participants in different clinical specialties. Most (62.1%) reported receiving psychiatric consultations, 48.3% general and family medicine consultations, 24.1% in nursing consultations, 10.3% in psychology consultations and 3.4% in cardiology consultations. At the time of the study, none of the participants were being followed up in Internal Medicine or Neurology consultations, nor were they attending Psychosocial Rehabilitation, Educational Programs, Socio-occupational Forum or any other program at home (Fig. 2. Consultations or programs attended by the participants).

Most participants (55.2%) reported taking psychiatric medication, approximately 30 per cent reported a previous psychiatric hospitalization and almost a quarter (24.1 per cent) were followed up at the psychiatric day hospital (Fig. 3. Psychiatric follow-up of participants).

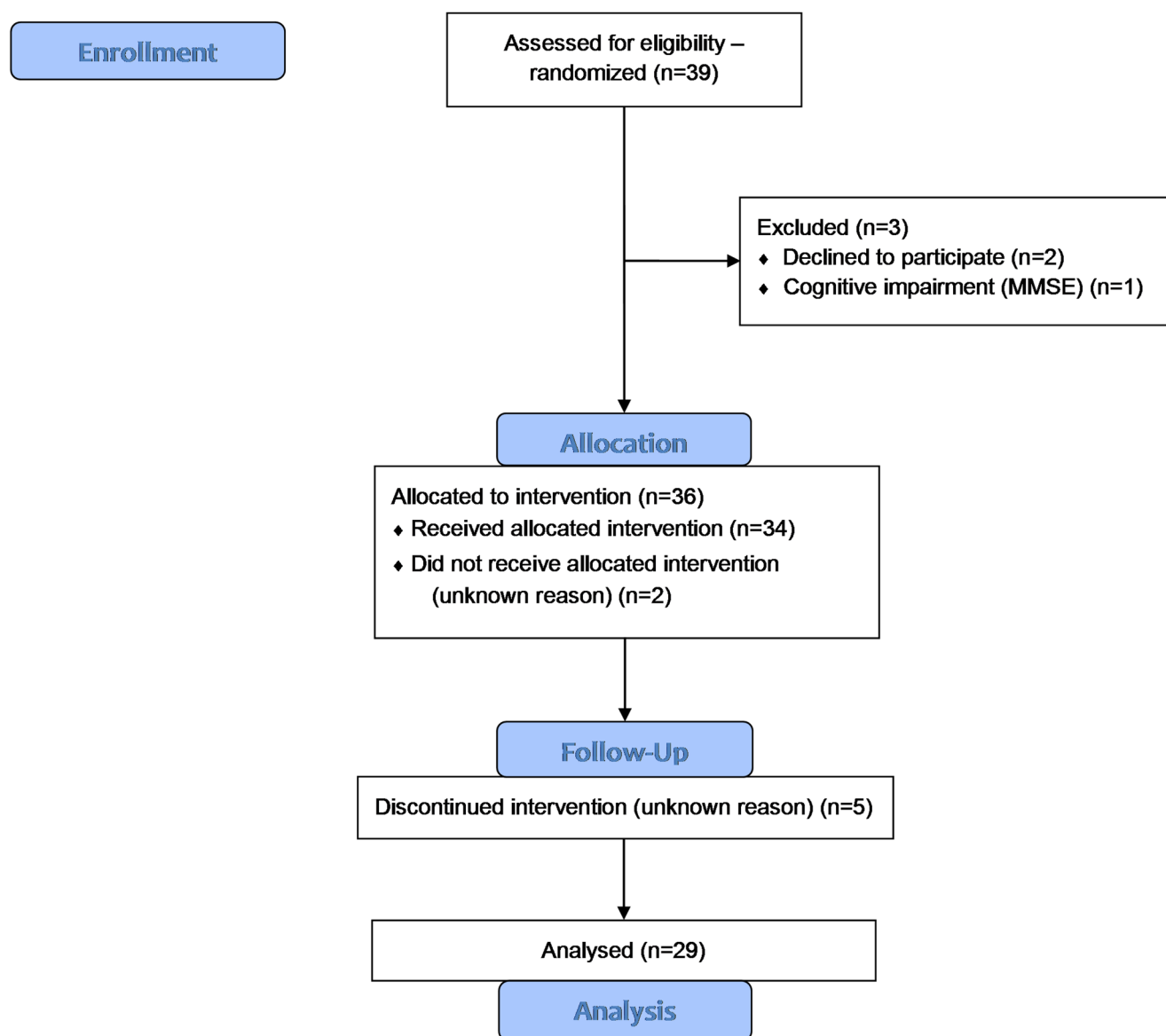


Fig. 1 Flow of participants during the study

Adherence and Acceptance of the Intervention

Adherence was high, such that participants attended on average 6 of the eight sessions. Regarding acceptance of the intervention, the intervention was evaluated very positively by the participants, with all participants considering the program to be useful, important and clear, and showing confidence in the trainers who implemented the intervention.

These results were assessed using the ‘Questionnaire on acceptability and satisfaction with the intervention’, a self-designed 21-item instrument employing a five-point Likert scale. (Fig. 4. Participants’ evaluation of the Metacognitive Training program).

Regarding the individual items, 100% of participants agreed or strongly agreed that they found the program useful

and important (item 1), that the training objective was clear to them (item 6), and that they felt in good hands with the therapists (item 18). 93% agreed or strongly agreed that they applied what they learned in the sessions to their daily lives (item 3), that the program was an important part of their treatment plan (item 4), that they liked the program (item 5), and that they would recommend it (item 7). Regarding the reversed items (interpreted as indicators of negative evaluation), 93% of participants strongly disagreed that they had to force themselves to participate (item 2), that their thinking became more confused or disorganized (item 8), that their mood or depressive symptoms worsened (item 9), and that the content overlapped with other treatment options (item 13). These results, at an individual level, collectively indicate a high and consistent level of acceptability, with

Table 4 Sociodemographic characterization of the sample

	N=29
<i>Sex, n (%)</i>	
Male	5 (17.2)
Female	24 (82.8)
<i>Age (years)</i>	
Average (min–max)	69 (60–81)
<i>Marital status, n (%)</i>	
Single	2 (6.9)
Married/In a stable relationship	17 (58.6)
Widowed	7 (24.1)
Divorced/Separated	3 (10.3)
<i>Education, n (%)</i>	
Attended school, but not higher education	23 (79.3)
Attended higher education	6 (20.7)
<i>Employment, n (%)</i>	
Employed	3 (10.3)
Unemployed	2 (6.9)
Retired	15 (51.7)
Retired due to disability	8 (27.6)
Sick leave	1 (3.4)
<i>Living situation, n (%)</i>	
Alone	9 (31.0)
Spouse/Partner	18 (62.1)
Other family members	1 (3.4)
Institutionalized	1 (3.4)
<i>Diagnosed diseases, n (%)</i>	
Yes	24 (82.8)
No	5 (17.2)
<i>Tobacco use, n (%)</i>	
Yes	3 (10.3)
No	26 (89.7)

no participant providing overall negative evaluations of the program.

The participants had the opportunity to answer some open-ended questions. Of particular note in relation to the item ‘I particularly liked:’ the answers ‘the explanations about the illness’, ‘hearing things I didn’t know’, ‘thinking about things’, ‘the socialising’; and in relation to the item ‘I think the following should be improved:’ the answers ‘more time for the meetings’, ‘everything was fine’. However, most participants chose not to answer the open response items.

Safety and Events

Safety and possible adverse events were monitored throughout the pilot study period utilizing differing approaches. The mental health professionals who conducted the sessions maintained continuous vigilance over the well-being of participants during all MCT-Silver sessions. The application of the PHQ-9 and BDI-II at baseline and post-intervention allowed for the identification of any worsening of depressive symptoms. No participant presented clinically significant worsening of symptoms. Although current suicidal ideation was an exclusion criterion at baseline, professionals remained vigilant for signs of risk throughout the intervention. No cases of emerging suicidal ideation were identified. In the post-intervention questionnaire, 93.1% of participants strongly disagreed that their mood and/or depressive symptoms had worsened and that their thinking had become more confused or disorganised after the training, suggesting an absence of adverse effects perceived by participants. MCT-Silver was considered a low-intensity intervention with a favourable safety profile.

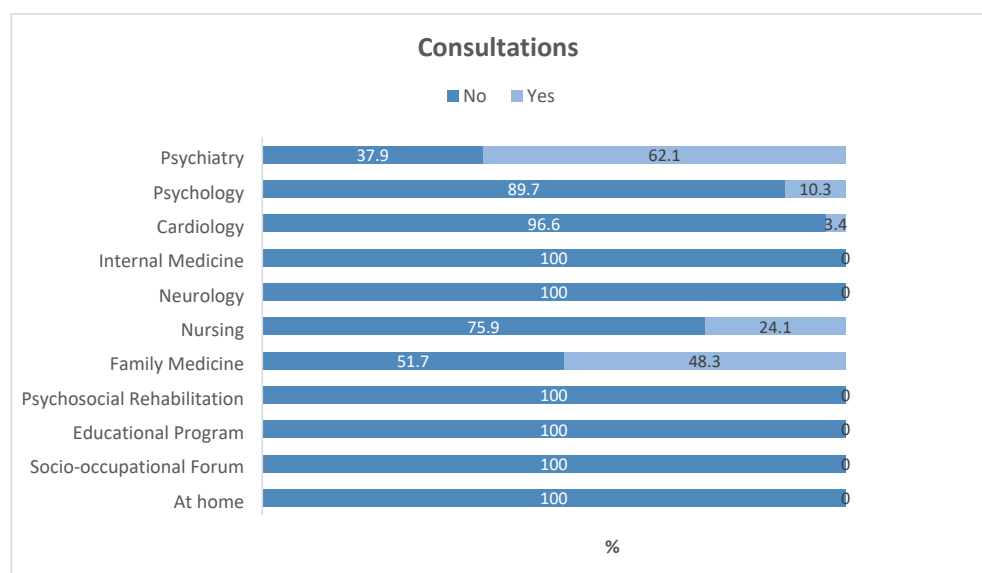
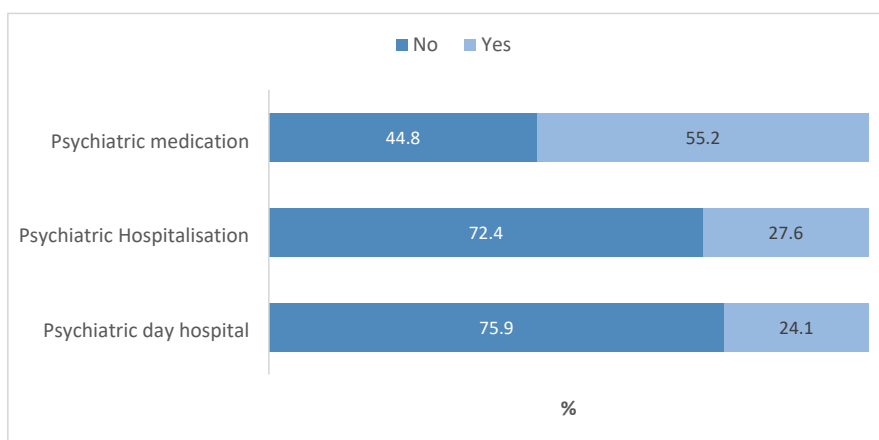
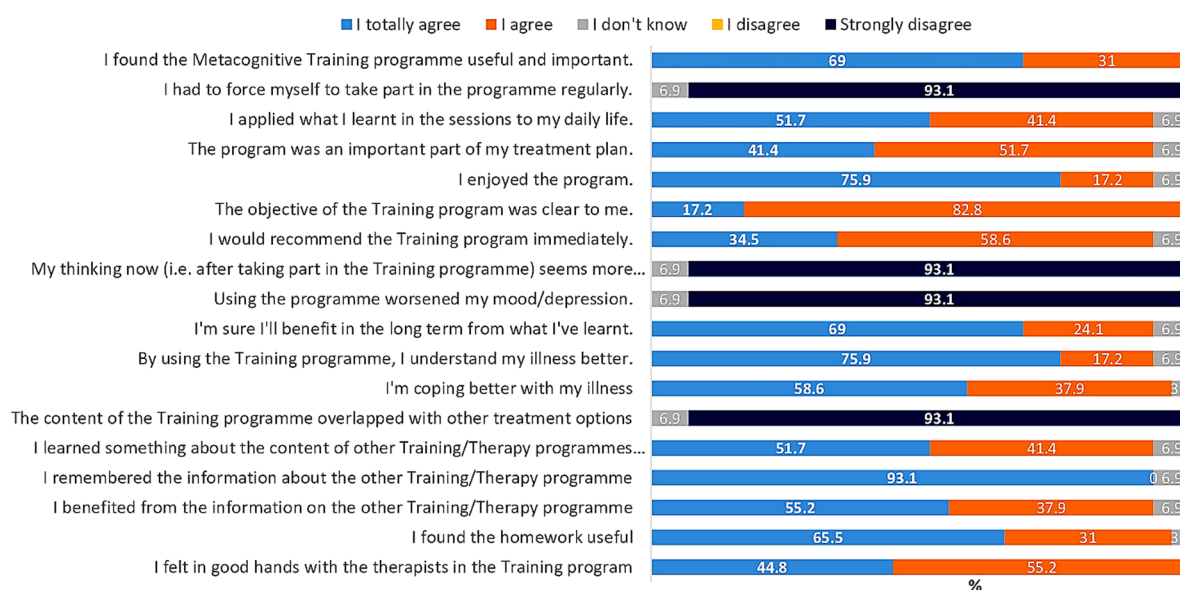
Fig. 2 Consultations or programs attended by the participants

Fig. 3 Psychiatric follow-up of participants

Intervention Evaluation

**Fig. 4** Participants' evaluation of the metacognitive training program

Further Outcomes

Statistical analyses showed statistically significant pre-post changes across all clinical measures; however, given the uncontrolled single-group design, these results should be interpreted as preliminary exploratory findings rather than as evidence of the intervention's efficacy. In the absence of a control group, the changes observed before and after the intervention cannot be attributed solely to MCT-Silver nor should they be interpreted as evidence of efficacy, as they may reflect confounding factors such as regression to the mean, natural fluctuation of symptoms, non-group-specific effects, or concomitant pharmacological treatment.

Descriptive statistics and comprehensive test results are summarized in Table 5. Participants showed a significant reduction in depressive symptoms as measured by the

BDI-II. Significant decreases were observed in the cognitive, affective, and somatic subscales (all $p < 0.001$). Similarly, depression severity measured by the PHQ-9 showed a robust decline. Metacognitive awareness improved significantly, with participants reporting fewer positive and negative beliefs about worry, as well as a reduced need for thought control (MCQ-30). Regarding ruminative processes (RRS), there was a significant decrease in both the reflexive and brooding subscales, indicating a reduction in repetitive negative thinking.

Psychological well-being markers improved significantly, with an increase in total self-esteem (RSES) driven by higher self-confidence and lower self-deprecation. Furthermore, participants exhibited a significant decrease in dysfunctional attitudes (DAS-18B), specifically

Table 5 Differences in the scores of the scales between pre- and post-intervention ($N=29$)

	Baseline	Post	Test statistic	df	p-value	Effect size
<i>Depressive symptomatology (BDI-II)</i>						
Cognitive [0–21]	16.3±3.9	10.7±2.8	$t=8.49$	28	<0.001	$d=1.58$
Affective [0–15]	12.6±2.0	8.6±2.1	$t=8.54$	28	<0.001	$d=1.59$
Somatic [0–27]	25.0±6.0	18.0±6.5	$Z=-4.42$	–	<0.001	$r=0.87$
Total [0–63]	51.0±13.5	36.0±12.0	$Z=-4.71$	–	<0.001	$r=0.87$
<i>Severity of depression symptoms (PHQ-9)</i>						
Total [0–27]	15.8±3.8	7.4±3.5	$t=12.05$	28	<0.001	$d=2.24$
<i>Metacognition questionnaire (MCQ-30)</i>						
Positive beliefs [6–24]	15.0±5.3	12.6±4.9	$t=2.48$	28	0.019	$d=0.46$
Negative beliefs [6–24]	15.4±4.4	11.8±4.1	$t=3.74$	28	<0.001	$d=0.69$
Need for thought control [6–24]	14.0±7.5	13.0±8.0	$Z=-3.14$	–	0.002	$r=0.63$
Total [18–72]	42.0±24.0	41.0±31.0	$Z=-2.92$	–	0.004	$r=0.55$
<i>Quality of life (WHOQOL-Bref)</i>						
Global [1–5]	2.0±1.5	3.0±1.0	$Z=-4.39$	–	<0.001	$r=0.90$
<i>Ruminative response scale (ERR-10)</i>						
Reflexive [5–20]	10.3±3.3	9.1±2.8	$t=2.26$	28	0.031	$d=0.42$
Cismar [5–20]	16.0±3.1	9.2±3.0	$t=9.80$	28	<0.001	$d=1.82$
Total [10–40]	26.3±5.7	18.2±5.6	$t=7.02$	28	<0.001	$d=1.30$
<i>Rosenberg self-esteem scale</i>						
Self-confidence [5–20]	10.7±2.5	14.9±2.2	$t=-7.34$	28	<0.001	$d=1.36$
Self-deprecation [5–20]	9.5±2.0	13.4±3.1	$t=-8.50$	28	<0.001	$d=1.58$
Total [10–40]	20.2±4.1	28.3±3.7	$t=11.69$	28	<0.001	$d=2.17$
<i>Dysfunctional attitudes scale (DAS-18B)</i>						
Performance evaluation based on results [5–35]	22.0±12.0	19.0±10.0	$Z=-4.70$	–	<0.001	$r=0.87$
Need for recognition from others [3–21]	14.0±7.0	12.0±6.0	$Z=-4.27$	–	<0.001	$r=0.79$
Performance evaluation based on self-demand [3–21]	13.0±5.0	12.0±4.5	$Z=-3.67$	–	<0.001	$r=0.68$
Total [18–126]	76.0±34.0	69.0±26.5	$Z=-4.71$	–	<0.001	$r=0.87$

Values are presented as mean±standard deviation for normally distributed variables and as median (interquartile range) for non-normally distributed variables. Paired-samples t-tests were used for normally distributed outcomes and Wilcoxon signed-rank tests for non-normally distributed outcomes. Effect sizes are reported as Cohen's d for t-tests and r for Wilcoxon tests. t =t-test statistic; df =degrees of freedom; Z =Wilcoxon signed-rank test statistic; p -value=probability value

Table 6 Exploratory simple linear regression analyses examining the association between session attendance and improvement in depressive symptoms

Dependent variable (change score)	β	SE	R^2	p-value
Δ PHQ-9	1.064	0.335	0.271	0.004
Δ BDI-II	0.904	1.053	0.027	0.398

Change scores were calculated as baseline minus post-intervention values; higher scores indicate greater symptom improvement. The independent variable was the total number of MCT-Silver sessions attended

regarding performance evaluation and the need for external recognition.

Finally, global quality of life (WHOQOL-Bref) improved significantly from baseline to post-treatment ($p<0.001$), with a large effect size ($r=0.90$).

To further explore whether greater exposure to the intervention was associated with larger symptom improvements, exploratory simple linear regression analyses were performed using total session attendance as the predictor and changes in depressive symptoms as the dependent variables. The total number of sessions attended significantly predicted

improvements in PHQ-9 scores ($\beta=1.06$, $p=0.004$), explaining 27.1% of the variance in symptom improvement ($R^2=0.271$). Specifically, each additional session attended was associated with an average reduction of approximately one point on the PHQ-9. Conversely, session attendance was not significantly associated with changes in BDI-II scores ($\beta=0.90$, $p=0.398$, $R^2=0.027$) (Table 6. Exploratory simple linear regression analyses examining the association between session attendance and improvement in depressive symptoms).

Discussion

Although an RCT of MCT-Silver was conducted in Germany (Schneider et al., 2024), we opted for an uncontrolled pilot study as a first step to examine the feasibility, acceptance and safety of this intervention in the Portuguese population of older adults. This methodological decision reflects the validated development trajectory of MCT-Silver itself. Schneider et al. (2018) initially conducted an uncontrolled

pilot study specifically to assess the feasibility and acceptability of MCT-Silver in older German adults. Only after confirming these parameters did the research team proceed to the RCT (Schneider et al., 2024). We are following this same evidence-based development trajectory, adapted to the Portuguese context.

The absence of a control group in this study is a deliberate and methodologically justified feature of the study design. The primary objective is to determine whether the intervention is feasible and safe, and whether participants consider it acceptable, objectives that can be achieved without a control group (Hertzog, 2008). The absence of a control group entails specific methodological consequences that must be acknowledged: without randomization and an adequate comparator, it is not possible to distinguish between the effects of MCT-Silver itself and other concomitant factors, including spontaneous symptom remission, non-specific group effects (e.g., social interaction, expectation), concomitant pharmacological treatment, or effects of repeated assessments. These threats to internal validity are explicitly acknowledged throughout this study and in the limitations section, where it is stated that the results should be interpreted only as preliminary exploratory conclusions. The planned randomized clinical trial will address these limitations by including an active, randomized control condition, allowing causal conclusions to be drawn about the efficacy of MCT-Silver in the Portuguese population.

This pilot study provides initial evidence regarding the safety, feasibility and acceptability of the intervention; however, further studies are needed to validate its efficacy, particularly in the Portuguese population. MCT-Silver has only been studied in psychiatric settings in Germany, where a pilot study (Schneider et al., 2018), and RCT were conducted (Schneider et al., 2024). Although these results were promising, the effects of MCT-Silver on depressive symptoms remain equivocal and a confirmatory study has not yet been conducted in Portugal.

The data from this study generally supports feasibility of the protocol, including aspects such as enrolment strategies, consent rate, intervention engagement, implementation of training, participation retention and questionnaire completion rate, which can help inform larger confirmatory trials. Promisingly, most participants approached agreed to participate (95%) and cognitive functioning was adequate for inclusion among most patients considered for inclusion (98%). Moreover, we were able to include 36 patients within 3 months, which speaks for a rapid enrolment rate and recruitment feasibility for a larger trial. Retention was adequate (85%); however, efforts may be necessary to ensure that retention remains at this level or higher for a future trial. Given that, on average, participants had severe depressive symptoms, future trials may need to assess whether these

participants have adequate motivation and energy to attend outpatient sessions. However, older adults often experience mobility or health problems which prohibit attendance, and these may have also accounted, at least in part, for drop-outs. Promisingly, all participants who completed the intervention also provided data at follow-up. Finally, training of the MCT-Silver trainers proved feasible, and trainers received positive ratings (e.g., 100% of patients indicated feeling confident in the trainers' abilities). Future studies may consider tracking trainer adherence formally. Due to limited resources, this was not possible in the current pilot study. Regarding safety, no adverse events were reported over the course of the intervention; however approximately 7% ($n=2$) indicated feeling that there was less clear following the training or that their mood had worsened. Although this rate is relatively low, future work would benefit from a broader measurement of side effects (Moritz et al., 2019).

A further main finding of this study is the high acceptance of the participants in many areas. For example, participants reported finding the program to be useful and important, and almost all (93%) indicated that they would like to apply the content to their everyday life. Understandable. Importantly, they also indicated enjoying the treatment (97%) and felt that they could cope better with their depression due to the training (97%). Moreover, session attendance was good such that participants attended on average six sessions. The average attendance of six out of eight sessions indicates a high degree of continuous engagement, particularly relevant given that the sample consisted of older adults with depressive symptoms, for whom motivation and energy to attend outpatient sessions may be reduced. Side effects and other negative effects (e.g., "my thinking now seems less clear."; "Using the program worsened my mood.") were minimal (7%). Taken together, this study provides initial support for the feasibility, acceptance and safety of the MCT-Silver intervention among older adults in Portugal. These findings are in line with the previous studies by Schneider et al., (2018, 2024); although acceptance was slightly higher in the current sample. These preliminary findings tentatively suggest that MCT-Silver may be a promising intervention for Portuguese older adults with depression; however, given the uncontrolled design of this pilot study, this interpretation should be confirmed in adequately powered controlled trials before any firmer conclusion can be drawn.

This suggests that MCT-Silver may be a promising intervention for Portuguese older adults with depression.

Acceptance of psychological interventions is fundamental to therapeutic success, constituting a significant predictor of treatment adherence and clinical outcomes (Biswal et al., 2024). Adherence to therapy not only influences treatment efficacy but also reduces healthcare costs and improves patients' quality of life (Religioni et al., 2025).

A further goal of this uncontrolled pilot study was to obtain preliminary estimates of pre- and post-treatment changes in depressive symptoms and other relevant outcomes as exploratory indicators for future trials. Statistically significant differences were observed between pre- and post-treatment for all outcomes; however, it should be emphasised that, given the absence of a control group, it is not possible to determine to what extent these changes can be attributed to MCT-Silver compared with other factors (e.g. spontaneous recovery, general effects of group participation, placebo effects, effects of medication). Although different scales were used, the magnitude of the pre-post changes in depressive symptom scores in the present study is consistent in terms of direction with the within-group results reported in the pilot study conducted in Germany. It should; however, be emphasized that the patients in the German pilot study were undergoing intensive inpatient or day clinic treatment (Schneider et al., 2018) and received MCT-Silver as an add-on treatment. In the current study, it should be also noted that approximately 50% of the patients were taking psychiatric medications during the trial and it is not possible to completely disentangle effects due to medication versus MCT-Silver.

The exploratory regression analyses suggest a dose-response relationship between intervention exposure and reductions in depressive symptoms measured by the PHQ-9. Although causal inferences cannot be drawn due to the uncontrolled design, these findings indicate that greater engagement with MCT-Silver may be associated with larger reductions in depressive symptoms and support the importance of maintaining high adherence in future randomized trials.

In line with the within-group analyses from Schneider et al. (2024), significant improvements for all other outcomes beyond depression, including metacognitions, ruminations, quality of life, and dysfunctional attitudes, were also found in the current study. These results should be regarded as preliminary exploratory findings, rather than as evidence of the intervention's efficacy, given the absence of a control group.

Previous work on MCT for depression has also reported decreases in ruminative responses after metacognitive training in young adults and middle-aged adults (Jelinek et al., 2013; Özgüç & Tanriverdi, 2023). Our study is also partially in line with the RCTs carried out in Germany regarding metacognitive beliefs. Whereas Jelinek et al., (2017a, 2017b) reported large improvements in metacognitive beliefs for D-MCT among middle-aged adults in a comprehensive rehabilitation program, Schneider et al., (2024) reported significant changes in the positive metacognitive beliefs, albeit with a small effect ($d=0.32$) among older adults completing MCT-Silver on an outpatient basis. Taken together, although interpretation of results is limited by the

lack of a control group, this provides further indication that reduction of depressive symptoms occurs alongside changes in purported mechanisms of change for metacognitive training (i.e., metacognitive beliefs and ruminations).

Additionally, one of the main aims of the MCT-Silver intervention is to reduce dysfunctional attitudes, which correspond to rigid and maladaptive beliefs about oneself, the world, others, and the future (Luty et al., 1999; Perez & Rohan, 2021) and are associated with, and are even predictors of, depressive symptoms. Several studies indicate that higher levels of dysfunctional attitudes are associated with greater intensity of depressive symptoms (Jugessur et al., 2021; Kërqeli et al., 2013; Qin et al., 2020; Xavier et al., 2023). To assess dysfunctional attitudes, we used the Portuguese version of the Dysfunctional Attitudes Scale (DAS-18B). If confirmed in an RCT, the reductions in dysfunctional attitudes observed in the current study may reflect MCT-Silver content addressing negative thought patterns and encouraging patients to identify alternative, helpful thoughts.

Previous evidence from a controlled trial suggests that MCT-Silver may be associated with reductions in rumination (Schneider et al., 2024), although further replication is warranted. Rumination is an emotional regulation strategy that is closely associated with the development and maintenance of depression (Watkins & Roberts, 2020). Older people who ruminate are more likely to have more frequent, more severe and longer depressive episodes (Shih et al., 2021). The significant reductions in rumination reported in the present trials are in line with the RCT carried out in Germany (Schneider et al., 2024). Interesting reductions in rumination mediated reductions in depression scores in the MCT-Silver group (Schneider et al., 2023). These findings need to be confirmed for Portuguese older adults in a controlled trial.

Beyond these MCT-Silver encourages participants to reflect on their thought processes, to identify possible cognitive biases, which can lead to greater self-awareness and realisation of their depression. At the same time, improved self-awareness can facilitate more open communication with the group trainer, reinforcing the therapeutic nature of the intervention (Minyaycheva et al., 2024). By specifically addressing negative cognitive beliefs, MCT-Silver participants may feel more empowered in their own treatment, which could lead to better management of depressive symptoms (Schneider et al., 2018, 2024).

It is important to emphasize that changes in metacognitive processes can go beyond symptom reduction and have significant implications for daily functioning, particularly for instrumental activities of daily living (IADLs). Metacognitive skills are closely linked to complex daily tasks that require self-monitoring, planning, and decision-making,

such as financial management, medication adherence, and problem-solving in real-life situations. Evidence from neurocognitive research suggests that metacognitive deficits, especially those related to self-awareness, task demands, and strategies, are associated with impairments in functional abilities, particularly financial capacity, which is considered an essential IADL in older populations (Giannouli & Tsolaki, 2023). These findings suggest that metacognitive interventions such as MCT-Silver may not only influence cognitive and emotional processes but may also have subsequent effects at the neural level, highlighting the importance of future studies that integrate behavioural and neuroimaging approaches to better understand the mechanisms of change.

Despite the large pre-post differences for many of the outcomes reported here, these may overestimate true effects of the MCT-Silver intervention, which is a brief intervention. Therefore, it should be underscored that these represent only exploratory signals. Critically, a controlled trial is necessary to determine whether the observed effects can be attributed MCT-Silver or are mainly due to factors such as medication, regression to the mean, placebo effects, and others.

Implications for Clinical Practice and Research

The results of this pilot study have significant implications for clinical practice in mental health and for the development of mental health research in the Portuguese context. From a clinical practice perspective, the results of this study, although preliminary and intended to assess the feasibility and acceptance of the intervention, indicate that MCT-Silver may be a viable, safe, and well-accepted intervention that mental health professionals can effectively implement in community-based mental health care settings. The modular structure of eight weekly sessions, with standardized and freely accessible materials, facilitates its integration into healthcare programs for older adults with depressive symptoms.

The high participation rate (an average of 6 sessions out of 8) and the very positive evaluation from participants suggest that this group approach is aligned with the principles of person-centered care, which are fundamental to contemporary healthcare.

From a clinical research perspective, this pilot study lays the groundwork for the development of a RCT to rigorously evaluate the potential efficacy of MCT-Silver in the Portuguese population of older adults. Demonstrating the safety, feasibility and acceptability of the intervention is a crucial step that justifies investment in more robust research. Future studies may explore: (1) the comparative efficacy of MCT-Silver versus other established non-pharmacological

interventions; (2) the maintenance of long-term therapeutic gains through follow-up assessments; (3) the specific mechanisms of change that mediate the reduction of depressive symptoms; (4) the adaptation of the intervention to different care settings and subpopulations of older adults (e.g., institutionalised versus community-dwelling).

Finally, the low-intensity nature and reduced cost of this intervention are particularly relevant in the current context of health systems, where there is a growing need for effective and sustainable responses to an increasingly ageing population.

Limitations

This study has some limitations, primarily the lack of a control group and thus, the fact that the results may be influenced by factors other than the intervention (e.g., novelty effect, medication, treatment expectations). We also only used item 1 of the WHOQOL-Bref and it is also essential to consider that not all participants may respond in the same way, so further evidence of potential efficacy is needed in a confirmatory trial. Additionally, the lack of follow-up assessment limits our understanding of the duration of the observed effects and whether the improvements are sustained over time.

The acceptability questionnaire used in this study is an instrument developed specifically for this purpose, adapted from the assessment tool used in the original German MCT-Silver studies, and has not been subjected to formal psychometric validation in the Portuguese population. Although the content of the items is quite similar to that of the original instrument, the absence of established psychometric properties limits the precision with which acceptability can be quantified. Future studies should consider validating this instrument or adopting a standardized and psychometrically validated measure of treatment acceptability.

The representativeness of the sample deserves critical analysis. Participants were recruited exclusively from three Local Health Units in the Alentejo region (Alto, Central and Baixo Alentejo), a predominantly rural area with a unique sociodemographic profile in southern Portugal, characterized by an aging population, lower population density and distinct socioeconomic conditions. Consequently, the results may lack external validity and cannot be directly generalized to older adults residing in large urban metropolitan areas (such as Lisbon or Porto) or in other regions with different sociocultural contexts.

Regarding the absence of a control group more specifically, this design choice prevents causal inference and limits the interpretability of outcome data in several important ways. Without a basis for comparison, it is not possible to establish that the improvements observed before and after

the intervention are attributable to the MCT-Silver intervention itself, as opposed to alternative explanations such as: (1) regression to the mean; (2) the natural course of depressive symptoms over time, which can fluctuate independently of any treatment; (3) non-specific therapeutic factors, including regular contact with mental health professionals, group cohesion, and the feeling of being cared for; (4) expectation and placebo effects associated with participation in a structured program; and (5) concomitant pharmacological treatment, since approximately 55% of participants were taking psychiatric medications during the trial. The decision to conduct an uncontrolled pilot study was made in accordance with established guidelines on pilot study methodology and feasibility (Hertzog, 2008; Lewis et al., 2021), and aimed to serve as a preparatory step for a full RCT. A future RCT with an active control group will be essential to isolate the specific therapeutic contribution of MCT-Silver beyond these non-specific factors, and to allow robust conclusions about its efficacy in older Portuguese adults.

Conclusion

The results of this pilot study suggest the feasibility and good acceptability of the MCT-Silver program among the older adults in our sample, pointing to a favourable safety profile and participant engagement. Changes were observed before and after the intervention in all clinical measures; however, given the uncontrolled, single-group design and the high prevalence of concurrent use of psychiatric medication (55.2%), these changes cannot be causally attributed to the MCT-Silver and should not be interpreted as evidence of the intervention's efficacy. The improvements observed may reflect, e.g., regression to the mean, placebo effects, group interaction, concurrent pharmacological therapy, or the natural course of depressive symptoms. These findings serve only as preliminary signal estimates to guide the planning of a future randomised controlled clinical trial.

From a clinical practice perspective, MCT-Silver may potentially serve as a standardized, low-cost, non-pharmacological strategy that can be easily integrated into mental health care in primary care and residential settings, once its efficacy has been confirmed in controlled trials. Ultimately, this study provides preliminary groundwork to support the design of future randomized controlled trials that may contribute to determining whether MCT-Silver represents a viable component in the multidisciplinary treatment of depression in older adults.

The main contribution of this study is to support the feasibility, acceptability and safety of the Portuguese implementation of MCT-Silver, although controlled studies are

still needed before conclusions can be drawn regarding its efficacy.

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Data Availability The data can be requested from the corresponding author upon reasonable request.

Declarations

Conflict of interest The authors declare no competing interests.

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