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Maria Margarida Baía Bastos da Rocha Maia

Outcomes and Challenges of Motivational Interviewing in Dual Diagnosis Treatment - a Systematic Review

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Maria Margarida Baía Bastos da Rocha Maia

Outcomes and Challenges of Motivational Interviewing in Dual Diagnosis Treatment - a Systematic Review

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NOME

Maria Margarida Baía Bastos da Rocha Maia

NÚMERO DE ESTUDANTE	E-MAIL
201807462	margaridabastosm@gmail.com

DESIGNAÇÃO DA ÁREA DO PROJECTO

Medicina clínica.

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"Outcomes and challenges of Motivational Interviewing in Dual Diagnosis treatment - a systematic review".

ORIENTADOR

Professora Doutora Margarida Maria Carvalho de Figueiredo Ferreira Braga

COORIENTADOR (se aplicável)

Dr. Pedro Miguel Carvalho Martins

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Eu, Maria Margarida Baía Bastos da Rocha Maia, abaixo assinado, nº mecanográfico 201807462, estudante do 6º ano do Ciclo de Estudos Integrado em Medicina, na Faculdade de Medicina da Universidade do Porto, declaro que:

☒ Não procedi à utilização de ferramentas de *chatbox* generativo baseadas em *large language models* para nenhuma das tarefas no contexto do meu trabalho de Dissertação ou Monografia

□ Procedi à utilização de ferramentas de *chatbox* generativo baseadas em *large language models* no contexto do meu trabalho de Dissertação ou Monografia, encontrando-se todas as interacções (*prompts* e respostas) transcritas em anexo bem como a indicação das aplicações utilizadas.

Neste sentido, confirmo que a eventual utilização de ferramentas de *chatbox* generativo baseadas em *large language models* no contexto do meu trabalho de Dissertação ou Monografia foi exclusivamente descrita na sequência de *prompts* e respostas transcritos em anexo e nas aplicações indicadas.

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Margarida Bastos Maia

Olhar para trás e recordar estes 6 anos é um momento intenso e nostálgico, no qual não poderia deixar de pensar em todas as pessoas que me permitiram chegar até aqui e terminar este percurso tão bonito e do qual me orgulho tanto.

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Tal como todos os anteriores capítulos da minha vida (e certamente os próximos também), esta história foi intensamente marcada por pessoas. É para mim uma sorte e um privilégio ter tido todas elas a fazerem-me crescer. Afinal, como Vergílio Ferreira disse, “a semente não germina senão na terra que a espera”.

Por fim, gostaria de dedicar esta dissertação a todas as pessoas com problemas de saúde mental, especialmente os ainda fortemente estigmatizados, como os que analiso nesta dissertação. Espero que um dia a sociedade finalmente vos proporcione uma terra fértil para germinar.

Outcomes and Challenges of Motivational Interviewing in Dual Diagnosis Treatment - a Systematic Review

Margarida Bastos Maia[a]*, Pedro Miguel Carvalho Martins [b], Margarida Figueiredo-Braga[c,d]

[a] *Faculty of Medicine, University of Porto, Porto, Portugal;*

[b]*Department of Psychiatry, ULS Tâmega e Sousa, Penafiel, Portugal;*

[c]*Department of Neurosciences and Mental Health Department, Faculty of Medicine, University of Porto, Porto, Portugal;*

[d]*i3S – Institute for Research and Innovation in Health, University of Porto, Porto, Portugal*

*Corresponding author: Margarida Bastos Maia, margaridabastosm@gmail.com, Address: Alameda Prof. Hernâni Monteiro, 4200-319 Porto, Portugal.

The authors have no competing conflicts of interest to declare.

Outcomes and Challenges of Motivational Interviewing in Dual Diagnosis Treatment - a Systematic Review

Background

Motivational interviewing (MI) is a patient-centered counselling approach which aims to promote behavior change by enhancing patient motivation through the exploration and resolution of ambivalence. This type of psychotherapy, initially designed for the treatment of Substance Use Disorders (SUD), is now seen as an effective way to manage chronic physical and psychiatric diseases. Dual Diagnosis (DD) patients are a complex group of psychiatric patients who have a particularly low treatment engagement, so it was hypothesized that MI would be a valuable add-on therapy.

This review summarizes the main findings of randomized controlled trials applying MI to patients' psychiatric condition and substance use. We aim to clarify previous inconsistent results regarding MI effectivity in this complex and challenging disorder.

Methods

A systematic literature search of PubMed/MEDLINE, Web Of Science and Scopus was performed. The final selection for this systematic review comprised exclusively randomized controlled trials (RCTs) comparing MI alone or integrated in routine care. All patients included in the selected studies were over 16 years old. Studies' quality assessment was conducted with the Jadad Scale.

Results

We found that intervention groups (IG) showed an improvement of functioning, psychiatric symptoms, medication compliance and substance use, although without statistical significance. Number of relapses, total days in relapse and alcohol binge days showed a significant improvement in favor of the IG ($p=0.002$, $p=0.0063$, and $p=0.02$, respectively).

Conclusions

Although there was a clear improvement in most of these outcomes, most studies failed to detect significant results. A significant clinical outcome of MI application was found in lower relapse occurrence and alcohol abuse. Disparity of findings may be due to the heterogeneity of the disorder, and/or to methodological limitations. Our results emphasize the need for more methodically sound RCTs with adaptable characteristics according to the specific pairing of psychiatric disease and substance of abuse.

Keywords: dual diagnosis, motivational interviewing, systematic review, substance use, psychiatric symptoms, medication compliance, relapse.

Introduction

Motivational Interviewing (MI) is a patient-centered psychotherapy which aims to promote behavior change by enhancing patient motivation through the exploration and resolution of ambivalence (Miller & Rollnick, 1991). It combines specific strategies with a patient-centered approach, such as listening to patients, considering their priorities, developing collaborative goals and expanding coping abilities that are congruent with patient values, preferences, and social environment (Glasgow et al., 2006). These activities are at the core of the 5As approach: Ask, Advise, Assess, Assist, and Arrange (Prochaska & DiClemente, 1983).

The MI counseling approach was first used to enhance motivation to reduce substance use in addictions and promote abstinence (Miller & Rollnick, 1991). Since then, health professionals have broadened its scope, to enhance medication adherence, to promote health behaviors, monitoring of chronic diseases, HIV risk behavior, bulimia nervosa, obesity, and Diabetes Mellitus care (Romano & Peters, 2015). When applied to psychiatric disorders, even though the use of MI as a stand-alone therapy has been found to be beneficial, it is often an add-on therapy to standard of care, including other kinds of psychotherapies, like cognitive behavioral therapy, to yield better results (Romano & Peters, 2015).

The stages of change theory by Prochaska and DiClemente offers a conceptual framework for understanding the processes of changing a particular behavior (Prochaska et al., 1992). For optimal MI implementation, the health professional should adapt to the phase of change (pre-contemplation, contemplation, preparation, action, maintenance, relapse) where the patient is currently at. Motivational interviewing should also be adapted to the reality of the patient, namely their comorbidities, environment, and social context. On the other hand, until recently, there were no standard, widely used assessments of MI delivery, culminating in a wide interpersonal variation of its implementation in past trials, which may wane its effects

(Glasgow et al., 2006). However, recent proposals for MI assessment permit to overcome this limitation (Campiñez Navarro et al., 2016; Dobber et al., 2015; Moyers et al., 2016).

The principles of MI have been developed and tailored to meet client needs. The principles represent conversational strategies that can help resolve ambivalence by expressing empathy, developing discrepancy, rolling with resistance, and avoiding argumentation and supporting self-efficacy (Martino et al., 2002). Moreover, MI does not intend to increase patients' motivation, but rather to enhance engagement in achieving the target goal, by resolving resistance and advising, supporting, and empowering for change (Romano & Peters, 2015).

Dual Diagnosis (DD), also called Co-Occurring Disorders (COD) or Dual Pathology, is applied to comorbidity of addictive disorders and other psychiatric disorders (Martínez-Raga & Szerman, 2015). Some definitions of DD narrow it to the existence of a severe mental illness, like schizoaffective disorders, and a Substance Use Disorder (SUD) (Buckley, 2006). For differential diagnosis between dual pathology and Substance-Induced Disorders, the 5th edition of the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2013) emphasizes the temporal association between the disorders in a longitudinal assessment. If the symptoms of the disorder appear prior to the substance use or after a long period of abstinence from said substance, a diagnosis of dual pathology should be considered (American Psychiatric Association, 2013). In terms of prevalence, roughly half (51.4%) of the patients who reported lifetime alcohol abuse or a SUD, also met criteria for at least one lifetime psychiatric illness, and 50.9% of those with a lifetime psychiatric disorder also had a history of SUD, according to the National Comorbidity Survey conducted in the U.S.A. (Kessler, 2004). Considering these rates, we should look at a DD hypothesis as being the norm, rather than the exception, amongst patients with psychiatric disorders and amongst patients with a

SUD (Szerman et al., 2022). Not surprisingly, around 70% of those who seek help for their addiction fit the definition of being dually diagnosed (Arias et al., 2013). This estimate could even be lower than the reality of DD, as the coexistence of these two diseases is particularly prevalent due to shared vulnerabilities and barriers to effective treatment, mutual exacerbation, common genetic risks, and patients resorting to self-medication to remedy psychiatric symptoms. This lack of understanding of DD leads to pitfalls in definition and classification, which culminates in underdiagnosis and undertreatment of these patients (Szerman et al., 2022). This poses a particular cause for concern because, besides presenting with a myriad of medical and social problems, even low levels of substance abuse or dependence represent a risk factor for serious complications, including suicide, poor adherence to treatment, more hospital admissions, violence (Barrowclough et al., 2001), jail-time, unemployment, homelessness and increase of HIV and hepatitis risk behaviors (Robert E. Drake et al., 2001), all resulting in a poor overall prognosis.

Current care for DD comprises specific pharmacotherapy for the psychiatric disorder and for the substances of abuse (for instance, naltrexone for alcohol abuse and methadone and buprenorphine in opioid abuse) and psychotherapy. Psychotherapeutic interventions can comprise cognitive behavioral therapy, family counseling, group therapy and other types of psychotherapy, depending on available resources and evidence of the most effective interventions on each specific disorder. Also, social workers have a key role in case management of DD patients, working alongside healthcare workers (Kelly & Daley, 2013).

The basic therapeutic approach to a dually diagnosed patient should follow the Three-Legged Stool Model, which includes staying clean and sober, taking medication, and participating in a DD specialty program. Motivational interviewing is included in this last element, usually in the form of the Dual Diagnosis Motivational Interviewing (DDMI)

(Martino et al., 2002). Naturally, if the patient poses a threat to themselves or to others, they receive appropriate crisis management, which may lead to hospital admission. Currently, MI is not included in crisis treatment, as there is no evidence supporting its inclusion, nor is it used as a stand-alone treatment (Martino et al., 2002).

For a long period of time, each psychiatric disorder and SUD in patients with a DD were treated separately. However, recent evidence shows that an integrated approach to both simultaneously, through understanding and tackling this vicious cycle of patients' symptoms leading to substance use and drug and alcohol use exacerbating symptoms, has shown better adherence to treatment programs (Bellack & DiClemente, 1999).

Nevertheless, as stated above, motivational interventions should be catered to the pathology at hand and DD particularly poses some challenges (Kelly & Daley, 2013). Foremost, we should keep in mind that dually diagnosed patients are a heterogeneous group of people, ranging from patients with mild depression periods and dangerous alcohol intake at one end, and patients with schizophrenia, a significant use of illegal and legal drugs and a chaotic living situation at the other end. Between these two ends are multiple combinations. The different ensembles of co-morbid and multiple psychiatric problems call for tailored treatment methods. Secondly, as a result of several courses of decompensation of psychotic symptoms and remission, there are some cognitive impairments, inattention, poor concentration and mental flexibility and disordered thinking the health professional must know how to deal with and get around during the management of the patient. Additionally, the severe and disabling symptoms, several failed treatment attempts, poor functional adjustments, and lack of social and familial support often contribute to the poor outcomes in this patient group. They also obviously play a part in the patient's demoralization and lack of intrinsic motivation, which are the big foundation of pursuing any kind of treatment (Martino et al., 2002). This motivation

fluctuates, and in individuals with dual pathology, this variance can be even more dangerous. Because of psychiatric disease progression, decompensations may cause relapses, adding on to every other factor that may affect patient motivation. In this context, it is especially important to be up to par with the person's stage of change (Prochaska et al., 1992). This is where MI may play a crucial role, in contrast with other kinds of psychotherapies.

Despite an increase in patient adherence to counseling sessions and cognitive behavioral therapy reported by some authors (Lawrence et al., 2017), there is no clear and robust evidence that MI improves medication adherence and reduced consumption of substances of abuse in patients with dual pathology. Some existing reviews show no statistically significant difference to routine care (Schwenker et al., 2023) (Hunt et al., 2019). However, keeping dually diagnosed patients engaged in treatment programs is challenging in itself, so the role of MI is incredibly important so a treatment can have the opportunity to yield its effects (Bellack et al., 2006). Nevertheless, it is crucial to find integrated approaches to dual pathologies, focusing treatments to both components in one single treatment program to better understand and manage patients' unique needs. Additionally, we also have available MI especially tailored to dually diagnosed patients (DDMI), which has shown to be effective as an add-on to management that tackles several challenges of the dually diagnosed patient (Martino et al., 2002). Taking this into account, more evidence should be created to support its widespread use.

To meet this gap, we proposed a systematic review of the existing randomized controlled trials on dually diagnosed patients, according to the broad definition of DD. The aim is to clarify how patients' psychiatric condition and their substance use was affected by MI integrated in routine care versus routine care by itself.

Methods

Eligibility Criteria

This review included completed randomized controlled trials written in English, Spanish or Portuguese, with or without blinding, that recruited only dually diagnosed patients who were submitted to MI alone or associated with routine care or submitted exclusively to routine care, depending on the results of randomization.

Dual pathology was defined as the presence of a psychiatric comorbidity and a SUD. Participants were also included regardless of ethnicity or gender.

Motivational interviewing could be integrated in individual, group, or family sessions, but its delivery and other details should be described in the methods of the study. Routine care was defined as the treatment a patient would receive if they had not been included in the respective randomized controlled trial.

Pursued outcomes were patient functioning, patients' symptoms, medication compliance, patient relapse, and patients' substance use.

Exclusion Criteria

Studies with participants under 16 years old and without a DD (this includes participants with an organic disease as part of the concept of dual diagnosis) were excluded. Studies which performed an intervention that didn't include in any way MI were excluded. Additionally, studies with participants that abused only tobacco were also excluded, since this substance is not classified as a substance of abuse (as it does not cause significant problems or distress, such as missing work, having legal or social problems, amongst others).

Information Sources, Search Strategy and Study Selection Process

This systematic review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines (Page, McKenzie, et al., 2021; Page, Moher, et al., 2021) and Cochrane collaboration recommendations (*Cochrane Handbook for Systematic Reviews of Interventions*, 2023). The literature search for article retrieval was achieved using MEDLINE/PubMed, Web of Science and Scopus as databases until January 12th 2024. The search used the following query: ("dual diagnosis" OR "psychiatric comorbidity" OR "dual pathology" OR "dual disorder") AND ("motivational interviewing" OR "motivational therapy" OR "motivational intervention"). The same search strategy and query was used for all electronic databases.

After article retrieval from the performed literature search, duplicate removal was performed by the automation tool incorporated in *EndNote 21 (*Team, *2013)*. Afterwards, the selection process included two phases - the screening phase, based on title and abstract reading, and the eligibility phase, based on reading of the full-text of the articles selected during the previous phase. During both phases, the first two authors worked independently and according to the inclusion criteria. After completion of these phases, disagreements were resolved by discussion of the fulfillment of the inclusion criteria in each of these mismatched studies. In the event of not reaching an agreement, the opinion of the third author was invoked and established as final.

Data Collection Process

Data collection was performed by the first two authors independently, in order to make less room for mistakes. A manual approach was adopted. The data was then manually inserted into *Microsoft Excel*.

Data Items

The outcome measures to define the chosen variables varied amongst studies. The measures, both direct (objective) outcome measures and indirect (subjective, self-assessed) outcome measures, including scores and scales applied by each study included in this systematic review, are detailed in Table 1.

An assessment of clinical relevance and statistically significant effects in the studies was performed. If a study demonstrated statistical significance for an effect, that effect was also deemed as clinically relevant.

Study Risk of Bias Assessment and Quality Appraisal

The selected studies for the review were submitted to a quality appraisal according to the Jadad Scale (Jadad et al., 1996).

The Jadad scale consisted of three items pertaining to randomization, blinding and disclosure of participant dropout and withdrawal. Trials submitted to this scale could score from 0 to 5 and trials with higher scores were better reported. High-quality trials scored a minimum of 3 out of 5 (Halpern & Douglas, 2005).

Results

Study Selection and Description of Studies

The screening and selection process of this systematic review is outlined in the Preferred Reporting Items for Systematic reviews and Meta-analysis (PRISMA) flowchart in Figure 1.

The initial search with the chosen query identified 55 records from PubMed/MEDLINE, 157 records from Scopus and 88 records from Web of Science. Of these 300 records, 122 duplicates were removed, resulting in 178 records to be screened by title/abstract. During the screening process of record selection, in case the abstract was not available, the study was included. As a result of this phase, 136 records were excluded, culminating in 42 articles acceptable for full-text investigation in the eligibility phase. Throughout this phase, amongst reports of the same study, only the report with the most relevant information to answer the aim of this systematic review was used. Additionally, amongst studies with the same population and which assessed the same outcomes, those with the largest sample and more follow-up time, respectively, were selected. Later, 34 further articles were removed for the reasons listed out in Figure 1. In the end, a total of 8 studies made the final cut and were eligible for this systematic review, according to the defined inclusion criteria.

Study Characteristics

The variables extracted to summarize the study characteristics include number of participants, follow-up period, demographic data, inclusion and exclusion criteria, ways of delivery, duration of the sessions, number of sessions and engagement in treatment. The study characteristics of each of the trials included in this review are detailed in Tables 2 and 3.

These 8 studies were published between 2003 and 2018. Their sample sizes ranged from 36 to 274 and summed up together accounted for 946 participants in total, with a mean age of 37.6 years and 71.3% of them were men. These studies were conducted in 5 different countries and follow-up time varied from 3 months to 18 months.

Most of the MI sessions were delivered in-person in the outpatient setting. They were mostly individual sessions that lasted an average of 60 minutes. Five of these studies delivered less than 10 sessions of MI, one study did not mention the number of sessions planned and 2 studies conducted more than 20 sessions. All the studies followed manual-based MI styles and their practicing counselors were supervised in different manners.

Risk of Bias within and across Studies

As mentioned above, two different tools were used to rate the studies' risk of bias - the Jadad Scale. These appraisals are also documented in Table 2.

Summary of results of the included studies

The main results are documented in Table 4.

Assessment of Functioning

Four of the included studies reported on patient functioning, either with the Global Assessment of Functioning scale (GAF) or with the Social Functioning Scale (SFS). One out of three studies concluded that there was a statistically significant improvement of the GAF score [p=0.048;(Haddock et al., 2003)]. However, Kikkert and colleagues reported similar functioning levels in the IG and in the control group (CG).

Assessment of Patients' Symptoms

Six studies addressed patients' symptoms. Three report on depressive symptoms either using Beck Depression Inventory-II (BDI-II) or the depression subscale of the Hospital Anxiety and Depression Scale (HADS depression), two reported on negative and positive psychotic symptoms through the Positive and Negative Syndrome Scale (PANSS) and the Insight scale and the last one studied anxiety levels with the HADS anxiety subscale. All preferred measures were appropriate for the main psychiatric diagnosis found in each study.

Regarding depression severity, Kay-Lambkin and co-workers concluded there was a significantly larger improvement of depression (based on mean reduction in the BDI-II score) in the IG over the CG ($p=0.024$). Graham and co-workers also found a superiority of the IG over the CG in this domain. However, the difference between groups was not statistically significant ($p=0.156$). Martino and colleagues reached the same conclusions. The only study that analyzed anxiety (Graham et al., 2016) found no effect of the intervention on patients' anxiety levels ($p=0.611$). The three studies that looked at psychotic symptoms found no statistically significant superiority of the intervention in the improvement of PANSS scores [$p=0.86$; (Hjorthoj et al., 2013)]. Finally, the only study that reported on insight levels found no statistically significant differences to their improvement in favor of the intervention [$p=0.178$; (Graham et al., 2016)]. Overall, four of the six studies did not find a significant superiority of the intervention in patients' symptoms.

Medication Compliance

Only Martino and colleagues analyzed psychotropic medication adherence, using the Substance Use Calendar, and intersected this information with collateral reported data. Although there was a statistically significant increase in medication adherence in both groups, there was no superiority of one group over the other.

Patient Relapse

Two articles presented results on patient relapse through inpatient hospital admissions or through the number and duration of symptom exacerbation for more than 2 weeks and requiring a change in management (Haddock et al., 2003). According to Bellack and co-workers, the IG showed a statistically significant reduction in inpatient admissions (p=0.002), unlike the CG, that also showed a decrease. Contrarily, Haddock and colleagues did not find a statistically significant difference between groups in this reduction, but described that the total number of days in relapse were lesser in the experimental group (p=0.0063).

Patients' Substance Use

All the included studies reported results regarding substance use. All of them reported on illicit drug use, three of them with a focus on cannabis use. Five of these studies also reported on alcohol use.

Santa Ana and colleagues and Kay-Lambkin and colleagues both evaluated alcohol abstinence and found no significant differences between groups (p=0.29 and p=0.582, respectively), with an increase of abstinence in both groups. Nevertheless, Santa Ana and co-workers found a significant effect in favor of intervention (p=0.02) when it comes to alcohol binge behaviors. Kay-Lamkin and colleagues detected a significant decrease in favor of intervention in the number of days of alcohol drinking (p=0.004), yet Santa Ana and co-workers showed no significant differences between groups concerning this same measure (p=0.19).

Now when we look at cannabis use, no studies securely gave the upper hand to the IG [p=0.25, (Hjorthoj et al., 2013); p=0.140, (Kay-Lambkin et al., 2011)] and Martino and colleagues even found that the CG was slightly better.

Abstinence and number of days with use of other drugs was studied by Santa Ana and co-workers and they found no superiority of the experimental group in none of these outcomes ($p=0.21$ and $p=0.22$, respectively).

When it comes to all substances of abuse, four out of five studies found no significant superiority of the IG over the CG, but Kikkert and co-workers did find a statistically significant difference between groups ($p=0.005$) in this outcome.

Discussion

The aim of this systematic review was to reflect on whether MI integrated in routine care or MI alone was better than routine care alone on a dually diagnosed patient's psychiatric symptoms and addictive behaviors - use of alcohol and illicit substances. Our chosen outcomes were patient functioning and psychiatric symptomatology, medication compliance, relapse and substance use. The inquiries for psychiatric symptoms were established for Schizophrenia and Schizoaffective Disorder, Major Depression and Anxiety Disorders. Consumption of substances like alcohol, cannabis and cocaine was investigated using measures as number of days of use in the past 30 days and number of joints smoked in the last month, amongst others. The instrumental psychiatric evaluation scores and scales detailed above were also used for outcome assessment.

The majority of the studies showed an improvement of all outcomes, although there were some exceptions. Kikkert and colleagues reported that functioning levels stayed the same, Graham and co-workers found no change in anxiety levels and Martino and co-workers noted that the CG had a slightly better improvement of cannabis use. However, there was a statistically significant effect of MI on total number of days in relapse, number of inpatient admissions and on reduction of alcohol binge-drinking behaviors.

Only three studies did not document any statistically significant differences in favor of MI in any of the proposed outcomes (Graham et al., 2016; Hjorthoj et al., 2013; Martino et al., 2006). In all the other selected studies at least one statistically significant outcome improvement in favor of MI was found. These outcomes were patient functioning, psychiatric symptoms (depression levels), relapse and substance use.

The studies that noted a statistically significant effect of MI tended to have a smaller sample size (Haddock et al., 2003), a shorter follow-up period (Kay-Lambkin et al., 2011; Santa Ana et al., 2007) or posed a higher risk of bias (Kikkert et al., 2018; Santa Ana et al., 2007).

Motivational interviewing mode of delivery and number of sessions and their duration were similar, whether the studies presented statistically significant results or not. We could speculate if the shorter follow-up period suggests that MI effects are short-term lasting.

There was one study which included contingency contracts in its intervention. For every negative urinalysis result, the patient would receive a sum of money, which increased for every consecutive negative result, until it reached a maximum amount. If a positive urinalysis was found, the financial reinforcement would be reset to the initial amount on the next negative result (Bellack et al., 2006). Although this encourages DD patients to engage in the program, it could imply some bias in the results, as the patients could be more driven to not consume substances in order to receive the monetary compensation. Nevertheless, it is a licit form of encouragement to improve DD patients' extrinsic motivation initially, despite the costs this method has. Plus, to note that Kay-Lambkin and colleagues, Martino and colleagues and Santa Ana and colleagues provided monetary reimbursement after each assessment. This reimbursement is not connected to outcome, so it may not influence patient behavior in a certain direction, not leading to any bias.

In Santa Ana and co-workers, the randomization process attributed participants to one of two groups, initially assigned to either the CG or the IG, but the assignment of the intervention would then switch weekly. Although this may seem like the randomization would then be undone, these swaps were taken into account during statistical analysis and in the report of the results, which made the revision team more comfortable with the inclusion of this study in the review. In this same study, both the intervention and the control were delivered by the same person, which could have introduced some bias. However, independent fidelity assessments found that the intervention and the control were indeed different, could be discriminated and the therapist adhered to the Group Motivational Interview manual (Santa Ana et al., 2007).

Considering the Jadad score of each included study, 75% of the included studies were considered high-quality evidence, confirming the robustness of the conclusions reached by the majority of the selected outcomes. These results are also in line with the literature, albeit we should keep in mind the limitations described ahead.

Limitations and Strengths

Limitations of this review and included studies encompass the following:

- The literature search was only performed in PubMed/MEDLINE, Scopus and Web Of Science databases. It would have been optimal to search more databases, like Cochrane Library, and search for unpublished sources of evidence, like congress repositories.
- A small number of studies met the inclusion criteria of this review. A number of excluded studies, for example, analyzed tobacco as the substance of abuse. This topic also requires several years to develop an adequate RCT.
- In most of these studies, raters were not blind for treatment condition. Therefore, we cannot safely exclude intervention bias.
- Some studies had smaller sample sizes which represent a higher risk of bias.
- All the included studies had control groups with a non-placebo treatment. Although this means we cannot eliminate the effect the control treatment may have, most of the included studies featured intervention groups whose intervention was MI and treatment as usual.
- The heterogeneity of assessment tools (measures, scales) used as outcome measures, as well as the wide variety of duration of each session, number of sessions, follow-up time and even modes of delivery of MI made comparisons difficult and accounted for the impossibility of performing a meta-analysis.
- Routine care is not identical in every hospital or even in different clinical situations.

On the other hand, this review's strengths include:

- This review only incorporated in its analysis studies whose participants were dually diagnosed. As previously declared, studies which included dually diagnosed patients, but also patients with only a psychiatric diagnosis or only a diagnosis of abuse of substances were excluded from this review, as this relationship would not fully affect the results and the purpose of the review would be lost.
- Only randomized controlled trials were included, as these present some of the highest quality of evidence in research. Therefore, the conclusions reached in this review are very reliable, especially if we also bear in mind the fact that a systematic review presents the best quality of evidence in research.
- The focus on not only substance use, but also other relevant outcomes in DD treatment, like psychiatric symptoms, general functioning and medication compliance is extremely relevant to the holistic approach of these patients. As acknowledged before, the secret to DD treatment is to tackle both conditions simultaneously and in an integrated fashion (Bellack & DiClemente, 1999). The positive effect of MI across all of these spheres proves just that.
- Although all of the studies were conducted in high-income countries, the ethnicity of the participants was quite diverse.

Conclusions

The main conclusion of the present review, as in other reviews of the same topic, is that MI has a positive impact on all the dimensions of DD, although this effect is not statistically significant, when compared to routine care. The statistically significant effects of MI found on total number of days in relapse, number of inpatient admissions and on reduction of alcohol binge-drinking behavior might be positive indicators of MI efficacy in lowering severe and debilitating symptomatology, improving health and lowering healthcare costs.

Like most of the more recent literature, proving an unequivocal positive effect of MI on DD is extremely difficult, as the reality of DD treatment is also extremely hard to manage and full of ups and downs (Martino et al., 2002). This complex disease, with its intricacies and interactions, are the reason for high drop-out rates, stigma, relapse, and other nefarious consequences that culminate in a snowball effect. The fact that DD's intricacies are also not fully understood also contributes to this hardship (Szerman et al., 2022).

In a nutshell, these conclusions support the need for more trials in order to obtain more data and create more knowledge to back up this counseling technique on DD treatment, as with any other non-pharmacological treatment for DD (Hunt et al., 2019). In future trials, researchers should aim for the intervention to be MI as a standalone non-pharmacological therapy and the control should only include pharmacological therapy, with no non-pharmacological approaches. Follow-up assessment should include a short-term timepoint and a long-term timepoint to study the possible short-term effects of MI. All of these five outcomes (patient functioning, psychiatric symptoms, medication compliance, relapse and substance use) should be considered, in order to encompass the dimensions of DD. Other outcomes may be considered, like unemployment, homelessness, and quality of life. Although not considered a substance of abuse, there could be future RCTs that also contemplate tobacco addiction, since we have data that supports the fact that mental health patients have high rates of tobacco use

(Pal & Balhara, 2016). Tobacco may not severely interfere with psychiatric symptomatology, but has hazardous health effects that we are already aware of and must prevent also in this population (Chang et al., 2021).

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Tables, Figures and other annexes

Table 1. Specificities of the instruments used as outcome measures

OUTCOME MEASURE	DESCRIPTION	SCALE	OUTCOME OF INTEREST
GLOBAL ASSESSMENT OF FUNCTIONING SCALE (GAF) (ENDICOTT ET AL., 1976)	Rating scale for evaluating the overall functioning of a subject during a specified period on a continuum from psychological or psychiatric sickness to health.	10 sections. Maximum overall score of 100. The higher the score, the better the individual's functioning.	Assessment of functioning
SOCIAL FUNCTIONING SCALE (SFS) (BIRCHWOOD ET AL., 1990)	Self-administered questionnaire used to evaluate social skills and social performance.	79 items. The higher the score, the better the social functioning.	Assessment of functioning
POSITIVE AND NEGATIVE SYNDROME SCALE (PANSS) (KAY ET AL., 1987)	Rating scale used to identify positive, negative, and general aspects of psychopathology in schizophrenia, as well as general psychopathology (including depression and anxiety) and cognitively related features.	30 items, scored from 1 (absent) to 7(extreme). The higher the score, the worse the symptoms.	Assessment of patients' symptoms
BECK DEPRESSION INVENTORY II (BDI-II) SCORE (UPTON, 2013)	Self-report instrument, based on DSM-IV, that screens for depressive symptoms over the previous 2 weeks. Validated for 13- to 80-year-old individuals.	21 items, scored from 0 (not at all) to 3 (severely). Maximum score is 63 points. The higher the score, the worse the symptoms.	Assessment of patients' symptoms
INSIGHT SCALE (BIRCHWOOD ET AL., 1994)	Rating scale used to assess changes in levels of insight in terms of awareness of symptoms, illness, and perceived need for treatment.	8 items, with each subscale scoring from 0 to 4, totaling a 12-maximum score. The higher the score, the better the insight.	Assessment of patients' symptoms
HOSPITAL ANXIETY AND DEPRESSION SCALE (HADS) (ZIGMOND & SNAITH, 1983)	Self-report instrument used to detect states of depression and anxiety in the setting of a hospital medical outpatient clinic. The anxiety and depression subscales are also valid measures of emotional disorder severity.	14 items, scored from 0 to 3. Maximum score is 42 points. The higher the score, the worse the symptoms.	Assessment of patients' symptoms
BRIEF PSYCHIATRIC RATING SCALE (BPRS) (VENTURA ET AL., 1993)	Instrument used to assess the presence and severity of various psychiatric symptoms, such as anxiety, depression, and psychosis.	24 items, rated from 1 (not present) to 7 (extremely severe). The higher the score, the worse the symptoms.	Assessment of patients' symptoms
TIMELINE FOLLOW-BACK (TFLB) (SOBELL & SOBELL, 1992)	A technique to retrospectively assess self-reported daily alcohol consumption.	-	Substance use
ADDICTION SEVERITY INDEX (ASI)	Tool used to assess the severity of a person's substance abuse and to provide a comprehensive overview of	The higher the score, the higher	Substance use

(MCLELLAN ET AL., 1992)	a person's addiction-related issues, like medical status, employment and support, drug and alcohol use, legal, family/social, and psychiatric status.	the need for treatment.	
OPIATE TREATMENT INDEX QUOCIENT (DARKE ET AL., 1991)	Self-report measure of the quantity and frequency of use of 11 substances. The score obtained represents the average number of situations of substance use in the past month.	A score of 1 means one use per day and a score of 0.14 means one use per week.	Substance use
MEASUREMENTS IN THE ADDICTIONS FOR TRIAGE AND EVALUATION (MATE) MODULE 1 AND 4 (SCHIPPERS ET AL., 2010)	Tool used to assess the degree of substance use (alcohol and 11 drugs) and to assess DSM-IV criteria for abuse and dependence based on self-reported information regarding frequency and quantity of substance use in the past 30 days.	-	Substance use
SUBSTANCE USE CALENDAR (MILLER & DEL BOCA, 1994)	Calendar- like tool used to register the days of substance use and how individuals felt on that day. Can also be used for registration of medication adherence.	-	Substance use
MAUDSLEY ADDICTION PROFILE (MARSDEN ET AL., 1998)	Instrument used to assess treatment outcome for people with drug and/or alcohol abuse. It covers substance use, health risk behaviors, physical/psychological health, and personal/social functioning.	60 items.	Substance use

Figure 1. PRISMA flowchart of the systematic review phases

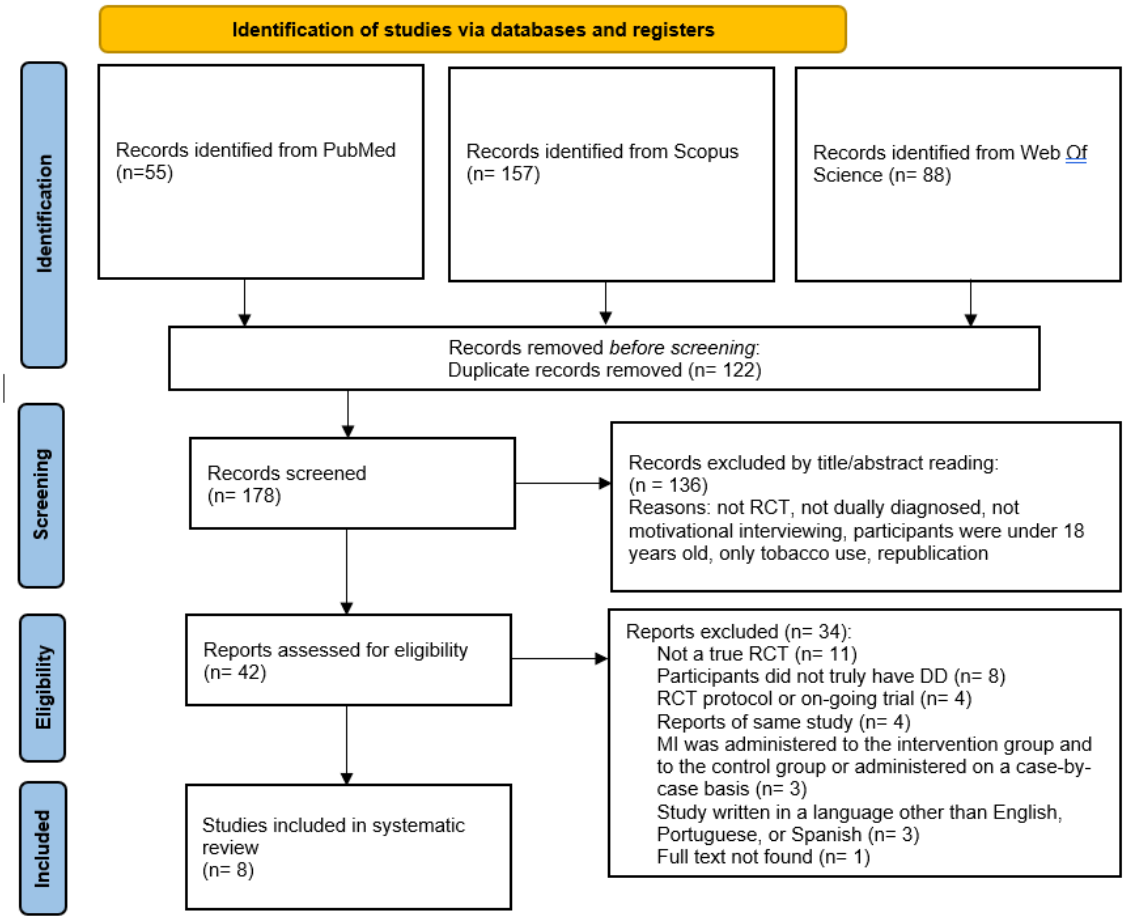

Table 2. Study characteristics

ARTICLE	COUNTRY	FOLLOW-UP	SAMPLE SIZE	QUALITY APPRAISAL (JADAD SCALE)	DEMOGRAPHICS (MEAN AGE, GENDER, ETHNICITY)	DEMOGRAPHICS (PSYCHIATRIC DIAGNOSIS, MAIN SUBSTANCE OF ABUSE)	TYPE OF ANALYSIS
BELLACK 2006 (BELLACK ET AL., 2006)	United States of America	6 months	175	Randomization: 2/2; Blinding: 0/2; An account of all patients: 1/1; Total: 3.	42.8 years; 66.4% males; 74.6% African Americans.	Major Affective Disorder (54.9%); Cocaine (68.6%).	Intention to treat.
KAY-LAMBKIN 2011 (FRANCES J KAY-LAMBKIN, 2011)	Australia	3 months	274	Randomization: 1/2; Blinding: 2/2; An account of all patients: 1/1; Total: 4.	40 years; 57% males.	Major Depressive Disorder (100%); Alcohol (61,3%).	Not mentioned.
HADDOCK 2003 (HADDOCK ET AL., 2003)	England	18 months	36	Randomization: 2/2; Blinding: 2/2; An account of all patients: 1/1; Total: 5.	31.1 years; 92% male; 100% white Europeans.	Schizophrenia (100%); Cannabis (61.1%).	Intention to treat.
HJORTHOJ 2013 (HJORTHOJ ET AL., 2013)	Denmark	4 months	103	Randomization: 2/2; Blinding: 1/2; An account of all patients: 1/1; Total: 4.	26.9 years; 75.8% males.	Schizophrenia (51.5%); Cannabis (100%).	Intention to treat.
KIKKERT 2018	Netherlands	12 months	154	Randomization: 1/2; Blinding: 0/2;	45.9 years; 80.4% males;	Schizophrenia (72.7%).	Not mentioned.

(KIKKERT ET AL., 2018)				An account of all patients: 1/1; Total: 2.	55.2% Non-Western.		
MARTINO 2006 (MARTINO ET AL., 2006)	United States of America	3 months	44	Randomization: 2/2; Blinding: 0/2; An account of all patients: 1/1; Total: 3.	31.7 years; 72.7% males; 54.5% African American.	Schizophrenia (43.2%); Cocaine (56.8%).	Intention to treat.
GRAHAM 2016 (GRAHAM ET AL., 2016)	United Kingdom	3 months	59	Randomization: 2/2; Blinding: 2/2; An account of all patients: 1/1; Total: 5.	38.6 years; 84.7% males; 39% White British.	Schizophrenia (61.0%); Cannabis (45.8%).	Intention to treat.
SANTA ANA 2007 (SANTA ANA ET AL., 2007)	United States of America	3 months	101	Randomization: 0/2; Blinding: 1/2; An account of all patients: 1/1; Total: 2.	37.5 years; 62.4% males; 77.2% Caucasian American.	Major Depression Disorder (58.1%); Alcohol (66.4%).	Not mentioned.

Table 3. Study characteristics (continuation)

ARTICLE	INCLUSION CRITERIA	EXCLUSION CRITERIA	MODES OF DELIVERY OF MI	NUMBER OF MI SESSIONS	DURATION OF MI SESSIONS	ENGAGEMENT IN TREATMENT
BELLACK 2006 (BELLACK ET AL., 2006)	- met DSM-IV criteria for current dependence on cocaine, heroin, or marijuana; - had SPMI (severe and persistent mental illness); - completed baseline assessments.	Not mentioned.	In-person individual MI sessions and small group sessions, both in the outpatient setting.	Only MI: 3 sessions.	Not mentioned.	IG was significantly more engaged in treatment than CG.
KAY-LAMBKIN 2011 (FRANCES J KAY-LAMBKIN, 2011)	- a BDI-II score of above or equal to 17; - concurrent use of alcohol or cannabis at harmful levels in the month before baseline; - no psychotic disorder; - above 16 years old.	- alcohol or cannabis use below harmful thresholds; - under 16 years of age; - diagnosis of a psychotic disorder; - were not fluent in English; - history of traumatic brain injury.	Delivered by a therapist or a computer in the outpatient setting.	9 sessions.	60 minutes.	No significant differences between treatment groups in level of attendance.
HADDOCK 2003 (HADDOCK ET AL., 2003)	- an ICD–10 and DSM–IV diagnosis of schizophrenia, schizoaffective disorder or delusional disorder; - a DSM–IV diagnosis of substance dependence or misuse; - aged between 18 and 65 years; - face-to-face contact with a carer for a minimum of 10 hours per week.	- organic brain disease; - learning disability.	Individual sessions in the outpatient setting.	29 sessions (MI+CBT).	Not mentioned.	Median number of sessions was 22, with maximum of 29 sessions. No information about differences between groups.
HJORTHOJ 2013 (HJORTHOJ ET AL., 2013)	- schizophrenia spectrum psychosis; - cannabis use disorder as a primary substance of abuse; - patients 17 to 42 years old;	Not mentioned.	Individual sessions in the outpatient setting.	24-28 sessions.	60 minutes (average)	Twenty-four sessions were planned and on average 16 were

	- residence in Copenhagen; - not requiring an interpreter; - the ability and willingness to give informed consent.					achieved. No differences between groups.
KIKKERT 2018 (KIKKERT ET AL., 2018)	- outpatients with a severe mental illness; Severe mental illness was defined as having a diagnosis of schizophrenia, a psychotic disorder, or a severe mood or anxiety disorder, and a history of continuous intensive mental health care in the past two years. - at least one SUD; A patient was considered to have a SUD if he or she fulfilled the DSM criteria for a SUD according to a self-report or according to their primary key worker.	No understanding of the Dutch or English language.	Individual sessions in the outpatient setting.	Not mentioned.	Not mentioned.	Not mentioned.
MARTINO 2006 (MARTINO ET AL., 2006)	- current DSM-IV criteria for a psychotic (schizophrenia, schizoaffective disorder, schizophreniform disorder or psychotic disorder not otherwise specified) and drug abuse or dependence disorder; - report at least 1 day of primary drug use in the past 8 weeks; - be prescribed psychiatric psychotropic medications by treatment randomization; - express interest in DD ambulatory program participation; - read and speak English.	- required detoxification; - needed acute inpatient psychiatric services.	Individual sessions in the outpatient setting.	2 sessions	60 minutes.	39 participants completed both interview sessions. No differences between groups.
GRAHAM 2016 (GRAHAM ET AL., 2016)	- 18 years or above; - ICD-10 diagnosis of schizophrenia, schizoaffective or delusional disorders, bipolar affective disorders or recurrent depressive disorder;	Not mentioned.	Individual sessions in the inpatient setting.	4 to 6 sessions + 1 booster session (completed in 30%)	15-30 minutes (average of 18.3 minutes).	70% of participants allocated to BIMI received the intervention. No information about differences between groups.

	- service users of community mental health services; - new admissions within the acute phase of severe mental health problems; - identified as misusing alcohol and/or drugs over the past month based on a minimum score of 3 on the Clinicians Alcohol/Drugs Use rating scale over the past 3 months; - had a care coordinator in a Community Mental Health Team.					
SANTA ANA 2007 (SANTA ANA ET AL., 2007)	- at least one current SUD; - a nonsubstance-related major Axis I disorder (e.g., major depressive disorder, bipolar disorder, anxiety disorder); - be able to speak, read and write in English.	- diagnosis of dementia; - current psychosis.	Group sessions in the inpatient setting.	2	120 minutes	No differences between groups regarding non-attendance.

Table 4. Summary of results of each study for the proposed outcomes

STUDY	INTERVENTION	CONTROL	OUTCOME MEASURES	RESULTS
BELLACK 2006 (BELLACK ET AL., 2006)	Behavioral Treatment for Substance Abuse in Severe and Persistent Mental Illness (BTSAS)	Supportive Treatment for Addiction Recovery (STAR)	- Substance use: urinalysis results and self-report of ASI (number of drug days and number of days with drug problems); - Relapse: inpatient admissions for psychiatric or substance abuse.	- Improvements on substance use ($p<0.001$) based on urinalysis results; no significant effect on ASI; - Statistically significant decrease in inpatient admissions/relapse ($p=0.002$) in IG; - Better functioning ($p<0.001$) in IG.
KAY-LAMBKIN 2011 (KAY-LAMBKIN ET AL., 2011)	Cognitive Behavioral Therapy/Motivational Interviewing (CBT/MI) delivered by a therapist*	Person-Centered Therapy (PCT)	- Patient symptoms: BDI-II score; - Substance use: number of drinks (considered harmful if above 4 for men and above 2 for women); harmful use of cannabis with the Opiate Treatment Index quotient score.	- Bigger improvement of depression symptoms in IG ($p=0.024$) - Bigger mean reduction in drinks per day in IG ($p=0.004$); there was a reduction in cannabis use ($p=0.140$); - There was a positive correlation between change in depression and change in alcohol use ($p < 0.001$), but no association between change in depression and change in cannabis use ($p = 0.179$).
HADDOCK 2003 (HADDOCK ET AL., 2003)	CBT + MI + family intervention + routine care	Routine care	- Functioning: GAF score and SFS score; - Patient symptoms: PANSS score; - Substance use: TLFB, percentage of days abstinent from the most frequently used substance and percentage of days abstinent from all substances; - Relapse: the number and duration of hospital admissions and the number and duration of exacerbations of symptoms lasting longer than 2 weeks and requiring a change in patient management.	- Better functioning in IG ($p=0.066$); - Significant improvement in IG over CG in PANSS negative subscale ($p=0.004$), but non-significant in the other subscales; - Greater percentage of days abstinent in IG, but not statistically significant; - Number of relapses was not significantly different between groups, but number of days in relapse showed a decrease in IG ($p=0.0063$).

HJORTHOJ 2013 (HJORTHOJ ET AL., 2013)	CapOpus (MI and CBT) + Treatment as usual (TAU)	TAU	- Substance use: TLFB for cannabis use and number of standard joints per month; - Patient symptoms: PANSS score; - Functioning: GAF score.	- Reduction in consumption of cannabis (p=0.25 for days of cannabis use, p=0.23 for number of standard joints per month); - No significant decrease in positive and negative symptoms (p=0.86 for PANSS total).
KIKKERT 2018 (KIKKERT ET AL., 2018)	Integrated Dual Diagnosis Treatment (IDDT) + Assertive Community Treatment (ACT)	ACT	- Substance use: MATE for alcohol and drugs; - Functioning: GAF score; - Patient symptoms: BPRS score.	- Significant reduction in IG regarding number of days of substance use in the last month (p<0.005); - Functioning was better in the CG at baseline and improved in this group while it remained at the same level in the IG; - No significant improvements in the other outcomes (BPRS).
MARTINO 2006 (MARTINO ET AL., 2006)	Dual Diagnosis Motivational Interview (DDMI)	Standard psychiatric interview (SI)	- Substance use: days of substance use (primary drug, secondary drug, and alcohol use in past 4 weeks) with Substance Use Calendar and TLFB; to assess self-report accuracy, urine drug screens under direct observation were administered; - Medication adherence: days of psychotropic medication adherence in past 4 weeks: Substance Use Calendar; - Patient symptoms: PANSS and BDI; - Functioning: GAF score.	- No significant reduction in frequency of substance use overall, except reduction in cocaine use (p=0.01), and cannabis use (p=0.01), both in favor of intervention; - Increased medication compliance, with no significant differences between groups; - Slower decline of negative symptoms in IG (p=0.03), but no other statistically significant differences found, despite the overall improvement; - No significant improvements in the other outcomes (BDI and GAF)
GRAHAM 2016 (GRAHAM ET AL., 2016)	Brief Motivational Intervention (BMI) + TAU	TAU	- Substance use: drug and alcohol number of days of use in the past 30 days and the average amount of use of each substance on a using day; - Patient symptoms: Insight Scale and HADS.	- Non-significant (P = 0.24) reduction in days of substance use in IG. - Bigger improvement of depression and insight in IG (p=0.156 and p=0.178, respectively); - No intervention effect regarding anxiety.

SANTA ANA 2007 (SANTA ANA ET AL., 2007)	Group MI (GMI) + TAU	Therapist attention activity control group (TAAC) + TAU	- Substance use: days spent drinking alcohol, binge drinking days and days using all illicit drugs.	- Improvement of abstinence from alcohol in both groups, with no differences between them (p=0.29). - Less binge drinking days in IG (p=0.02). - No differences in drinking days between groups (p=0.19). - Improvement of abstinence from illicit drugs in both groups, with no differences between them (p=0.21). - No differences in drug use days between groups (p=0.22).

*this article had another intervention (CBT/MI delivered by computer), yet it was not considered for the purpose of this review.

PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page and paragraph/ table #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both. **- MANDATÓRIO**	**Page 1 – Title:** "Outcomes and challenges of Motivational Interviewing in Dual Diagnosis - a systematic review".
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number. **– SEGUIR RECOMENDAÇÕES DA REVISTA**	**Page 2.**
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. **– MANDATÓRIO** ***O rationale corresponde à justificação da importância da revisão sistemática***	**Page 7, paragraph 1.** "However, keeping dually diagnosed patients engaged in treatment programs is challenging in itself, (…) Taking this into account, more evidence should be created to support its widespread use."
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS). **- MANDATÓRIO**	**Page 7, paragraph 2.** "To meet this gap, we proposed a systematic review (…) was affected by MI integrated in routine care versus

			routine care by itself.”
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number. **– FACULTATIVO**	Not applicable since the elaboration of a protocol was not performed for this systematic review.
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale. **– MANDATÓRIO** ***É altamente recomendado, de acordo com as boas práticas da Cochrane, que não sejam aplicados critérios de exclusão baseados na língua e/ou data de publicação dos estudos.***	**Page 8, paragraphs 1 to 4**. “This review included completed randomized controlled trials written (…) patient relapse and patients’ substance use, regardless of outcome measures.”
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched. **– MANDATÓRIO** ***Em consonância com as boas práticas da Cochrane, é mandatório que se verifique pesquisa em pelo menos duas bases de pesquisa bibliográfica (idealmente, deverão ser pesquisadas duas bases generalistas e uma específica da área). No caso de revisões sistemáticas de estudos experimentais/ensaios clínicos aleatorizados, é altamente recomendado que uma das bases pesquisadas corresponda à CENTRAL ou a bases de ensaios clínicos como a ClinicalTrials.gov.*** ***Estudos de revisão da literatura em que a pesquisa decorra numa única base de dados não serão classificados como revisões sistemáticas.***	**Page 9, paragraph 1**. “The literature search for article retrieval was achieved using MEDLINE/PubMed, Web Of Science and Scopus as databases until January 12th 2024.”
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated. **– MANDATÓRIO** ***A query de pesquisa deve ser obrigatoriamente disponibilizada. A utilização de filtros de pesquisa da InterTASC é altamente recomendada (https://sites.google.com/a/york.ac.uk/issg-search-filters-resource/home)***	**Page 9, paragraph 1.** “The search used the following query”
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis). **– MANDATÓRIO** ***As fases de selecção dos estudos primários devem ser descritas. Em consonância com as boas práticas da Cochrane, é mandatório que o processo de selecção envolva duas fases (fase de rastreio,***	**Page 9, paragraph 2.** “After article retrieval from the performed literature search, duplicate

		em que os registos são seleccionados por título e abstract, e fase de inclusão, na qual se procede à leitura integral dos full texts). Em cada uma destas fases, o processo de selecção deve mandatoriamente envolver dois investigadores actuando de forma independente.	removal (…) established as final."
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators. **– MANDATÓRIO** ***Trata-se de descrever de que forma se procedeu à extracção de dados dos estudos primários. Em consonância com as boas práticas da Cochrane, tal processo deverá envolver dois investigadores de forma independente.***	**Page 9, paragraph 3.** "Data collection was performed by the first two (…) inserted into Microsoft Excel."
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made. **– MANDATÓRIO** ***Trata-se de descrever as variáveis para as quais foi obtida informação.***	**Page 8, paragraph 4; page 10, paragraph 1; table 1.**
Risk of bias in individual studies / Risk of bias across studies	12/ 15	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis. **– MANDATÓRIO** ***Em todas as revisões sistemáticas, deverá existir um processo de avaliação da qualidade dos estudos primários. No caso de revisões sistemáticas de estudos experimentais/ensaios clínicos aleatorizados, a aplicação dos critérios de risco de viés (Risk of Bias) da Cochrane é altamente recomendada. No caso de revisões sistemáticas de estudos observacionais, poderão ser seguidos os critérios ROBINS ou os critérios dos National Institutes of Health (https://www.nhlbi.nih.gov/health-topics/study-quality-assessment-tools).***	**Page 11, paragraphs 3 and 4.** "The selected studies for the review (…) scored a minimum of 3 out of 5."
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means). **– FACULTATIVO. APENAS NECESSÁRIO SE FOR FEITA META-ANÁLISE**	Not applicable since a meta-analysis was not performed.
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis. **– FACULTATIVO. APENAS NECESSÁRIO SE FOR FEITA META-ANÁLISE**	Not applicable since a meta-analysis was not performed.
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified. **– FACULTATIVO. APLICÁVEL APENAS SE FOR FEITA META-ANÁLISE**	Not applicable since a meta-analysis was not performed.
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram. **– MANDATÓRIO**	**Figure 1.**

PRISMA 2009 Checklist

Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations. **– MANDATÓRIO**	**Tables 2 and 3.**
Risk of bias within and across studies	19/ 22	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12). **– MANDATÓRIO**	**Table 2.**
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot. **– FACULTATIVO. APLICÁVEL APENAS SE FOR FEITA META-ANÁLISE**	Not applicable since a meta-analysis was not performed.
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency. **– FACULTATIVO. MANDATÓRIO APENAS SE FOR FEITA META-ANÁLISE**	Not applicable since a meta-analysis was not performed.
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]). **– FACULTATIVO. APLICÁVEL APENAS SE FOR FEITA META-ANÁLISE**	Not applicable since a meta-analysis was not performed.
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers). **– MANDATÓRIO**	**Page 16, paragraphs 2 to 4.** "The majority of the studies (…) MI effects are short-term lasting." **Page 18, paragraph 1.** "Considering the Jadad score (…) mind the limitations described ahead." **Page 20, paragraphs 1 and 2.** "The main conclusion of the present review (…) contributes to this hardship."
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias). **– MANDATÓRIO**	**Pages 18, paragraphs 2 to 9.**

			"Limitations of this review (…) or even in different clinical situations."
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research. **– MANDATÓRIO**	**Page 20, paragraphs 1 to 3.** "The main conclusion of the present review (…) must prevent also in this population."
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review. **– SEGUIR RECOMENDAÇÕES DA REVISTA**	**Page 21, paragraph 1.** "This review had no sources of funding and has no competing conflicts of interest."

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

INSTRUCTIONS FOR AUTHORS

AIMS and SCOPE

Journal of Dual Diagnosis is a quarterly, international publication that focuses on the full spectrum of complexities regarding dual diagnosis. The co-occurrence of mental health and substance use disorders, or "dual diagnosis," is one of the quintessential issues in behavioral health. Why do such high rates of co-occurrence exist? What does it tell us about risk profiles? How do these linked disorders affect people, their families, and the communities in which they live? What are the natural paths to recovery? What specific treatments are most helpful and how can new ones be developed? How can we enhance the implementation of evidence-based practices at clinical, administrative, and policy levels? How can we help *clients* to learn active recovery skills and adopt needed supports, *clinicians* to master new interventions, *programs* to implement effective services, and *communities* to foster healthy adjustment? The Journal addresses each of these perplexing challenges.

Journal of Dual Diagnosis includes articles and perspectives from four overarching domains relevant to the field: Psychopharmacology & Neurobiology; Psychotherapy & Psychosocial Issues; Services & Policy; and Clinical Forum. Each issue serves to encourage integration of these domains. The Journal seeks to publish articles relevant to a wide range of people interested in dual diagnosis: researchers, physicians, clinicians, trainees, administrators, and policy makers. High-quality empirical research, brief reports, timely reviews, thought-provoking commentaries, and ongoing discussions of clinical issues will be considered for publication, all with the aim of developing a better understanding of the basis of, and optimal treatment for, co-occurring psychiatric and substance use disorders.

POLICIES

The policies of the *Journal of Dual Diagnosis* are in accordance with the International Committee of Medical Journal Editors.

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By submitting a manuscript, authors are declaring that neither the manuscript nor its data have been previously published (except in abstract) or are currently under consideration for publication.

Authorship

All persons designated as authors should qualify for authorship. Each author should have participated sufficiently in the work to take public responsibility for the content. The corresponding author affirms that he or she had access to all data from the study, both what is reported and what is unreported, and also that he or she had complete freedom to direct its analysis and its reporting, without influence from the sponsors. The corresponding author also

affirms that there was no editorial direction or censorship from the sponsors. Preparation of drafts of manuscripts by employees of the sponsor who are not listed as authors is expressly prohibited.

Authorship credit should be based on:

1. Substantial contributions to conception and design or analysis and interpretation of data.
2. Substantial contributions to drafting the article or revising it critically for important intellectual content.
3. Final approval of the version to be published
4. Participation was not limited only to the acquisition of funding for the research or position as chair or director of a relevant department, division, or research group.

All four conditions must be met. Participation solely in the acquisition of funding or the collection of data does not justify authorship. General supervision of the research group is also not sufficient. Any part of an article critical to its main conclusions must be the responsibility of at least one author. Only those with key responsibility for the material in the article should be listed as authors; all others contributing to the work should be recognized in the Acknowledgments section.

Disclosure of Potential Conflicts of Interest

The submission must contain an explicit and unambiguous statement describing any potential conflict of interest, or lack thereof, for all of the authors as it relates to the subject of the article. Examples include: “Dr. Smith reports no financial relationships with commercial interests.” “Dr. Smith receives compensation as a consultant for XYZ Company, a manufacturer of antidepressants.” “Dr. Jones and Dr. Smith have financial holdings in ABC Company, which distributes haloperidol.” “Dr. Jones owns a patent on the diagnostic device described in this article.” These statements acknowledging or denying conflicts of interest must be included in the manuscript under the heading “Disclosures,” which should appear just before “References.”

There must also be a listing for each author, detailing the names of organizations, institutions, companies, and individuals from whom they have received compensation for professional services in any of the previous three years, or from whom they anticipate receiving such compensation in the near future, whether or not these affiliations appear to have any relevance to the topic covered in the submission. Neither the precise amount received from each entity nor the aggregate income from these sources needs to be provided. Professional services include any activities for which the individual is, has been, or will be compensated with cash, royalties, fees, stock or stock options in exchange for work performed, advice or counsel provided, or for other services related to the author’s professional knowledge and skills. This would include, but not necessarily be limited to, the identification of organizations from which the author received contracts or in which he or she holds an equity stake if professional services were provided in conjunction with the transaction. The authors are expected to disclose any other financial holdings or considerations, such as stocks, bonds or donations of

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The *Journal of Dual Diagnosis* will not make specific recommendations as to whether a relationship requires disclosing. If there is a question as to whether a relationship is relevant, disclosure is the preferred course of action.

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Manuscripts that describe research with human subjects or animals must explicitly state that the research was conducted in accord with relevant legal and ethical standards. Authors must state the name of the committee (e.g., IRB) that approved and monitored the study. For research with human subjects, authors must include statements indicating that there was a complete discussion of the study with potential participants; that written informed consent was obtained after this discussion (or if a waiver of consent was obtained, an explanation of this); and that the study was conducted in accordance with the Declaration of Helsinki. For research conducted with animals, authors must indicate that institutional and national guidelines for the care and use of animals were followed.

Confidentiality

Participants and patients have a right to privacy that should not be violated without informed consent. Identifying information, including names, initials, or hospital numbers, should not be published in written descriptions, photographs, or pedigrees unless the information is essential for scientific purposes and the patient (or parent or guardian) gives written informed consent for publication. Nonessential identifying details should be omitted. Informed consent should be obtained if there is any doubt that anonymity can be maintained. If identifying characteristics are altered to protect anonymity, such as in genetic pedigrees, authors should provide assurance, and editors should so note that such alterations do not distort scientific meaning.

Registration of Clinical Trials

Broad access to the research literature and the rights of our authors are important to the *Journal of Dual Diagnosis*. The journal requires, as a condition of consideration for publication, registration of clinical trials in an acceptable public trials registry. Trials must be registered at or before the onset of patient enrollment. For this purpose, a clinical trial is defined as any research project that prospectively assigns human subjects to intervention or concurrent comparison or control groups to study the cause-and-effect relationship between a medical intervention and a health outcome. Medical interventions include drugs, surgical procedures, devices, behavioral treatments, process-of-care changes, and the like. The Journal does not advocate one particular registry, but requires authors to register their trial in a registry that

meets several criteria. The registry must be accessible to the public at no charge. It must be open to all prospective registrants and managed by a not-for-profit organization. There must be a mechanism to ensure the validity of the registration data, and the registry should be electronically searchable. Authors are required to report which registry they use and the number of their study within that registry.

MANUSCRIPT PREPARATION AND SUBMISSION

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General

Manuscripts should be prepared in accordance with the *Publication Manual of the American Psychological Association*, Sixth Edition. The manuscript (except tables and figures) must be formatted with one-inch margins all around, double-spaced, and font Times New Roman 12. All pages must be numbered. Use jargon and abbreviations sparingly. Use active voice, first person, and short sentences whenever possible. Language should be gender-neutral and follow the people-first philosophy.

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Types of Submissions

The *Journal of Dual Diagnosis* will accept a range of manuscripts for consideration. These are described below. All word limitations refer only to the “Text” section of the manuscript (i.e., Introduction, Methods, Results, and Discussion).

Articles (research and non-research reports)

Articles should not exceed 3,500 words, although some exceptions may be granted by the Editors. Generally, articles will be research reports of original work, presenting new data based on a relative large number of participants. Appropriate research will follow the highest scientific standards and offer important advances in the field of co-occurring disorders.

Brief Reports

Brief Reports should not exceed 2,000 words. These manuscripts are typically reports of research based on a relatively small number of participants, or of research yielding important information for the field of co-occurring disorders despite substantial limitations.

Literature Reviews

Reviews will typically be invited by the Editors, but the Journal will accept unsolicited manuscripts. Reviews should not exceed 7,000 words in length, should focus on recent literature, and should synthesize important information on a topic of special interest to the field of co-occurring disorders.

Editorials & Commentaries

While editorials and commentaries will typically be invited by the Editors, the Journal will accept uninvited submissions of less than 2,000 words.

Clinical Reviews

Clinical reviews will be included in the "Clinical Forum" section of the Journal. These manuscripts should present high-quality literature reviews on a topic of substantial importance in the clinical care of people with co-occurring disorders, along with a case description that illustrates the major features of the topic. Both invited and uninvited manuscripts that conform to this format will be accepted for review. Manuscripts submitted for the Clinical Forum section should not exceed 3,500 words, and should lead with the case description followed by the literature review.

Letters to the Editors

Letters should not exceed 500 words and will be published at the discretion of the Editors. Case reports that are not supported by a literature review and synthesis may be submitted as a letter.

Format of Submissions

Submissions to the Journal must include two parts: (1) manuscript (with tables and figures included at the end of the document, or in separate files), and (2) signed author forms from all authors. Specific instructions for each are below.

1. Manuscript

   Title Page

   Title: Succinct and descriptive
   Short Title: Maximum of 50 characters and spaces
   Authors:
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Abstract Page

Abstract:

- Structured under the headings of *Objective*; *Methods* (for review articles it will be important to specify the methods of literature search and selection); *Results*; and *Conclusions*.
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Results

Discussion, including a description of the strengths and limitations of the study.

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