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Targeting emotion dysregulation in depression: an intervention mapping protocol augmented by participatory action research

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Abstract

Background Depression is a highly prevalent and often recurrent condition; however, treatment is not always accessible or effective in addressing abnormalities in emotional processing. Given the high prevalence of depression worldwide, identifying and mapping out effective and sustainable interventions is crucial. Emotion dysregulation in depression is not readily amenable to improvement due to the complex, time-dynamic nature of emotion; however, systematic planning frameworks for programs addressing behavioral changes can provide guidelines for the development of a rational intervention that tackles these difficulties. This study proposes an empirical and theoretical art-based emotion regulation (ER) intervention using an integrated approach that combines intervention mapping (IM) with participatory action research (PAR).

Methods We used the IM protocol to identify strategies and develop an intervention for patients with major depressive disorder (MDD). As applied in this study, IM comprises six steps: (a) determining the need for new treatments and determinants of risk; (b) identifying changeable determinants and assigning specific intervention targets; (c) selecting strategies to improve ER across relevant theories and research disciplines; (d) creating a treatment program and refining it based on consultations with an advisory group; (e) developing the implementation plan and conducting a PAR study to pilot-test it; and (f) planning evaluation strategies and conducting a PAR study for feedback on the initial testing.

Results Following the steps of IM, we developed two frameworks for an art-based ER intervention: an individual and an integrative framework. The programs include four theory- and evidence-based ER strategies aimed mainly at decreasing depressive symptoms and improving ER in patients with MDD. We also developed a plan for evaluating the proposed intervention. Based on our preliminary PAR studies, the intervention was feasible and acceptable for adoption and implementation in primary care settings.

Conclusion The application of IM incorporated with PAR has resulted in an intervention for improving ER in depression. While changing behavior is perceived as a challenging and elaborate task, this method can be useful in offering a clear structure for developing rational interventions. Further refinement is necessary through rigorous research.

Keywords Depression, Emotion regulation, Intervention mapping, Participatory action research, Psychotherapy

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Background

Depression is a highly prevalent and often recurrent condition that severely impairs psychological functioning and quality of life. According to the Global Health Data Exchange, depression affects 3.8% of the world's population and, as "a major contributor to the overall global burden of disease," is associated with substantial societal and personal costs [1, 2]. Due to its enormous impact on public health, the World Health Organization (WHO) predicts that depression will rank first among all causes of the burden of disease by 2030 [3]. As depression is frequently comorbid with other mental and physical disorders, it is particularly challenging to identify risk factors and develop effective interventions.

Depression is a disorder of emotion. Disordered affect is a hallmark of depressive episodes, characterized by complex but apparent abnormalities of emotional functioning [4, 5]. Many factors may be associated with the disorder; however, its symptoms evidently indicate failures in emotional self-regulation [6]. Emotion regulation (ER) refers to an individual's ability to modulate the intensity, frequency, and duration of emotional responses [7, 8]. Decades of empirical research have shown that depression is associated with increases in unpleasant emotions and decreases in positive emotions [9, 10]. It has been proposed that difficulties in ER in depression significantly contribute to dysfunctional emotions [10, 11].

The complexity and time-dynamic nature of emotion make emotion dysregulation in depression particularly challenging to tackle. Most situations in daily life that evoke emotions are ambiguous. It remains unclear how patients can enhance their ER abilities in treatment [12]. Dysfunctional ER is a fundamental risk factor for the onset of depression and a range of psychiatric disorders [13, 14]; however, the evidence base is diffuse and broad, as its mechanisms remain poorly specified [12, 15, 16]. Although some studies have developed psychological interventions to improve ER, research in this area remains limited [12, 17, 18]. Some have argued that teaching a wide range of ER strategies might not be effective in enhancing patients' emotional functioning [12, 17]. Of note, there is a lack of research on the use of art psychotherapy in this context.

An intervention mapping (IM) study systematically rooted in the evidence and theories of basic affective science is required to increase the likelihood of changing behaviors in ER. To target emotional dysregulation, a systematic, participatory, and integrated approach that benefits from efficient behavior change is crucial [19]. Accordingly, this study determines effective ways of enhancing patients' ER capacities and developing an optimized art-based psychotherapy intervention for

depression. For this purpose, we followed the standard IM protocol [20]. While developing a treatment may be time-consuming and burdensome, this study provides a straightforward, stepwise decision-making procedure. Along with its use of participatory action research (PAR), this study aims to benefit from the engagement of patients and mental health professionals in a collaborative manner. This type of collaboration is a practical and powerful tool for developing specialized interventions.

Methods

Intervention mapping protocol

This study mapped out the process of development based on IM, a program-planning framework. IM provides a step-by-step process for planning theory/evidence-based interventions from the needs to potential methods addressing those needs [20, 21]. Since its development in the healthcare field in 1998, IM has been widely used and applications have emerged in other fields, including health promotion. It has been used to develop intervention programs to better target specific behaviors, including health, discrimination, and safety behaviors [22]. In particular, mental health researchers have largely applied the IM approach for either creating new interventions or adapting existing ones: strategies have been developed for the treatment and prevention of depression through IM, such as an internet-based intervention for postpartum depression [23], an online-coaching blended program for depression in middle-aged couples [24], a return-to-work intervention for depression [25], music therapy for depressive symptoms in young adults [26], and life-review therapy for depressive symptoms in nursing home residents [27]. The use of IM has proven to be a useful instrument for the development and optimization of treatments for depression that are tailored to different contexts and target populations.

Over the course of the development of the entire program, four perspectives characterizing IM are applied: (a) a *participation approach* that engages intended participants, allies, and implementers in program development, implementation, and evaluation; (b) a *systems approach* acknowledging that an intervention is an event occurring in a system that includes other factors influencing the intervention; (c) a *multi-theory approach* that stimulates the use of multiple theories; and (d) an *ecological approach* recognizing the relevance of social, physical, and political environmental conditions.

The IM protocol includes six core steps: (i) justifying the rationale for developing a new treatment; (ii) selecting targeted determinants and setting treatment goals; (iii) determining theoretical and empirical methods for behavior change; (iv) developing a treatment and program materials; (v) planning for adoption and

implementation; and (vi) specifying the evaluation design [20, 21, 28]. The development process is cumulative: subsequent steps are based on completed tasks from the previous step. Figure 1 presents the six steps of IM. This article presents the details of our study methods and the results as the six steps of the IM process.

Steps 1–3 of IM: Literature review

To address Steps 1, 2, and 3, we conducted a literature review using PubMed, ProQuest, Scopus, PsycArticles, and Google Scholar. Search strategies were devised using subject headings such as “emotion regulation,” “depression,” “emotional psychopathology,” “emotion regulation therapy,” and “art psychotherapy” as appropriate for each database. Furthermore, the program planners identified and included additional free text words. Due to the heterogeneity of emotion-related processes, the search strategies for Steps 1–3 were broad [15]. Additionally, we conducted an inclusive literature review of relevant databases to identify articles related to art-based interventions for ER, limited to published articles in English. This literature study identified effective ER strategies for improving regulatory capacities in depression. We describe the theoretical details related to ER and ER strategies in the Results section.

Steps 4–6 of IM: Participatory action research combined

Steps 4–6 of IM occasionally incorporate further studies for pilot testing and refining the intervention under development. As such, our study added participatory components to the IM process. PAR is “a participatory and consensual approach towards investigating problems and developing plans to deal with them.” [29] PAR empowers research participants compared with other approaches, where study participants are often considered subjects who passively follow directions [30]. The involvement of patients, care providers, and health professionals in research design is increasingly recognized as an essential approach for improving the quality of primary care [31] and bridging the gap between research and health care [32]. Indeed, PAR has been applied in many fields and achieved successful results, particularly in the field of mental health [33].

In particular, patient involvement is a meaningful partnership with stakeholders, including patients, carers, and public stakeholders, who actively participate in improving healthcare practices [31]. Involvement can occur at different levels and commonly includes patient engagement and advisory boards [32]. We conducted participatory action studies to combine systematic studies with the development of practical treatments [33] and

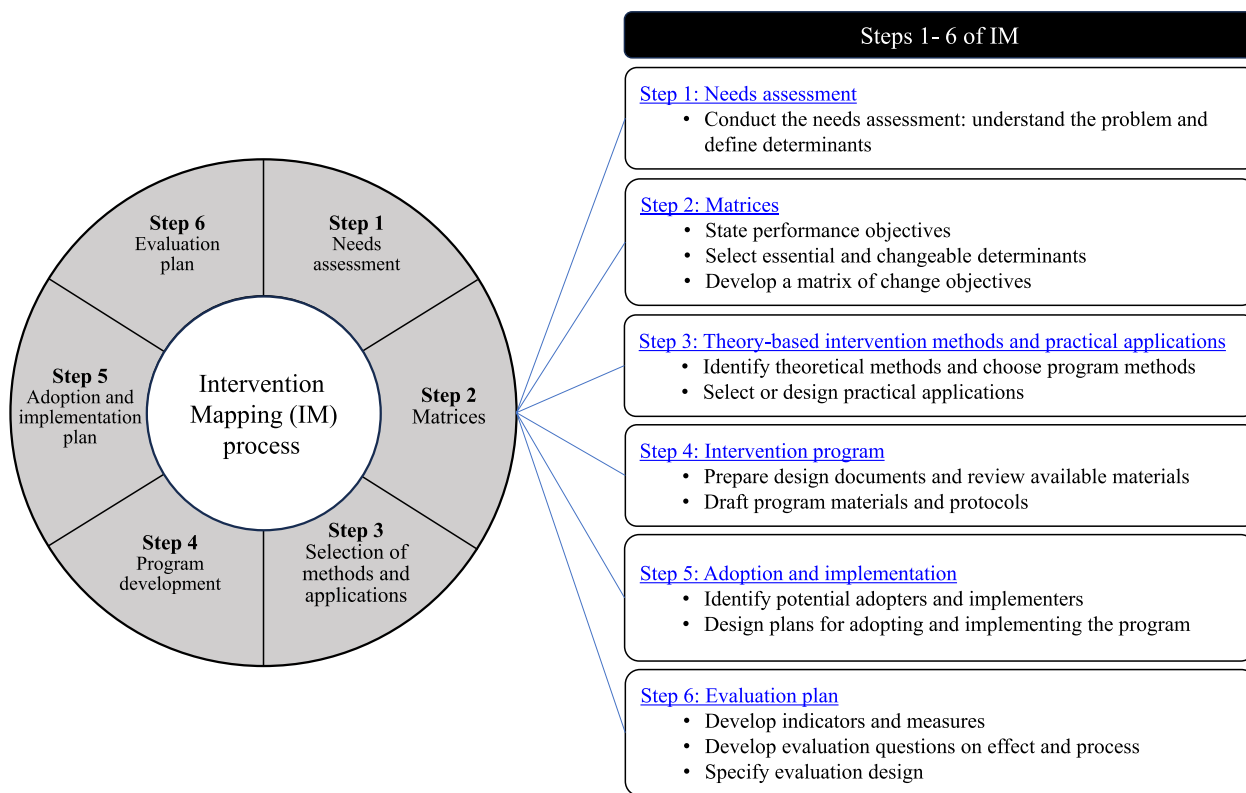


Fig. 1 Overview of the intervention mapping (IM) process [20]

anticipated the benefits of experiential knowledge. Figure 2 elaborates on how we incorporated PAR in the IM framework. It also presents our strategies to address the IM protocol and the results from each step. As described in Fig. 2, the PAR in this current study comprises three phases:(a) consultation with an advisory board; (b) initial testing of intervention; and (c) mixed methods feedback studies using focus group interviews and survey research.

(a) PAR 1: Consultation with the advisory board

First, we established an advisory board that included a psychiatrist, an expert on methodology, a trained integrative medicine professional, and a professor in a graduate art psychotherapy program. The advisory board provided feedback at the individual level and comments during subsequent consultations. We engaged and managed the advisory board throughout Step 4, the intervention development process.

(b) PAR 2: Initial testing of intervention being developed

In addition, we conducted a participatory action study to facilitate patient engagement and elicit their voices in a collaborative relationship with researchers. Based on voluntary participation, this study aimed to pre-test art-based ER strategies and treatment designs. We

conducted an art therapy program as part of routine inpatient therapeutic programs involving willing patients. The participants’ reports of their experiences during the sessions were obtained using structured questionnaires and unstructured interviews. For research purposes, we conducted a retrospective chart review for therapeutic sessions between February 2023 and February 2024. This review was approved by the Institutional Review Board of Kangdong Sacred Heart Hospital (IRB no. 2024–02-019) and exempted from requiring patients’ informed consent because it was part of a routine clinical practice.

(c) PAR 3: A mixed-method approach

In this study, we employed a mixed-methods approach to plan evaluation strategies by combining a quantitative online survey with focus group interviews. The primary aim of this study is to ensure that the intervention developed in Step 4 can be adopted and maintained over time. For this purpose, we are gathering feedback regarding the initial interventions from clinic staff, consisting of nurses and psychiatrists. This PAR study is currently ongoing and will last for four months. At the environmental level of the organization, the process will be managed to best leverage the intervention in primary care settings. This study was approved by the Institutional Review Board

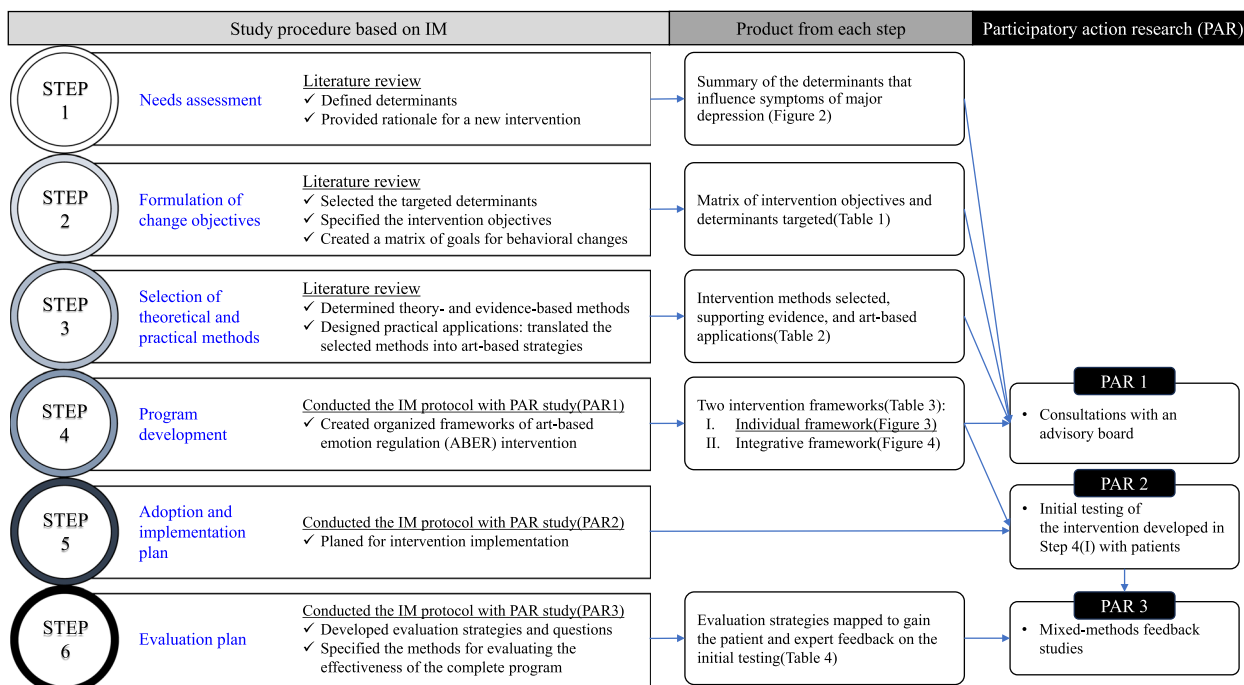


Fig. 2 Study procedure combined with PAR, strategies applied for each step, and results for each step

Noted. The figure specifies strategies to adopt in addressing the six steps of IM protocol and the actions for each step. It represents how IM can be applied and how it can augment its protocols through PAR. In the application of IM, this study relied on literature research and empirical studies: we conducted a literature study to address Steps 1–3 and combined the participatory action approach with IM methodology to address Steps 4–6

of Kangdong Sacred Heart Hospital (IRB no. 2023–12–002). PAR 2 and PAR 3 are currently being conducted; the results of those studies will be available after their completion.

Results

This section focuses on the explanation of outputs obtained through the IM protocol. The details of the theoretical and empirical bases, designed frameworks, and strategies for the implementation and evaluation of the program are categorized into six steps:

Step 1. Needs and Logic for the Program

For the first step, we identified the target group and analyzed their determinants. This step included determining the rationale and need for a new art-based ER intervention for depression. The target population comprised patients diagnosed with major depressive disorder (MDD). Predefined behaviors targeted were core symptoms of major depression, namely, consistent depressed mood and anhedonia [6].

Theoretical evidence

Prior research has highlighted difficulties in ER contributing to the etiology and maintenance of numerous psychiatric symptoms, such as depression, chronic anxiety, post-traumatic stress disorder, eating disorders, and worry [15, 34–40]. In particular, research on depression has emphasized that apparent failure to modulate emotions is a hallmark of this disorder [6] and has attempted to link it to emotional abnormalities in depression [10, 11]. ER, which influences the onset, magnitude, and duration of emotional response [41], is a distinct and

differentiated higher-order construct from emotion itself (i.e., fear, anxiety, and depression) at different levels of analysis (e.g., behavioral or neural) [42, 43]. From this perspective, ER is an important determinant affecting lower-order factor variability, whereas emotion determines variance downwards in the lower-order indicators [42].

A literature review revealed that ER difficulties play a role in understanding psychological health in major depression. This suggests the importance of altering problematic patterns of emotional reactivity in depression and identifies emotion dysregulation as a determinant of the predefined target behaviors [17, 44–47]. According to imaging studies utilizing functional magnetic resonance imaging (fMRI), functional abnormalities in specific neural systems support the processing of emotion and ER in patients with depressive disorders [6]. Moreover, decades of empirical evidence supports the notion that depressive symptoms, characterized by consistently elevated depressed mood and relatively low positive mood, are associated with difficulties in ER [9, 10, 16]. Our review allowed us to analyze and specify the determinants of depressive symptoms (Fig. 3). Without this analysis, it would be challenging for psychological treatments to address emotion dysregulation in MDD.

Needs assessment for a new intervention

Although emotion dysregulation is a critical target in psychological treatments, intervention research examining ER is limited [18, 48]. Psychotherapeutic approaches, including cognitive-behavioral and acceptance-based behavioral treatments, have positive effects on overall ER, and studies suggest that these improvements may

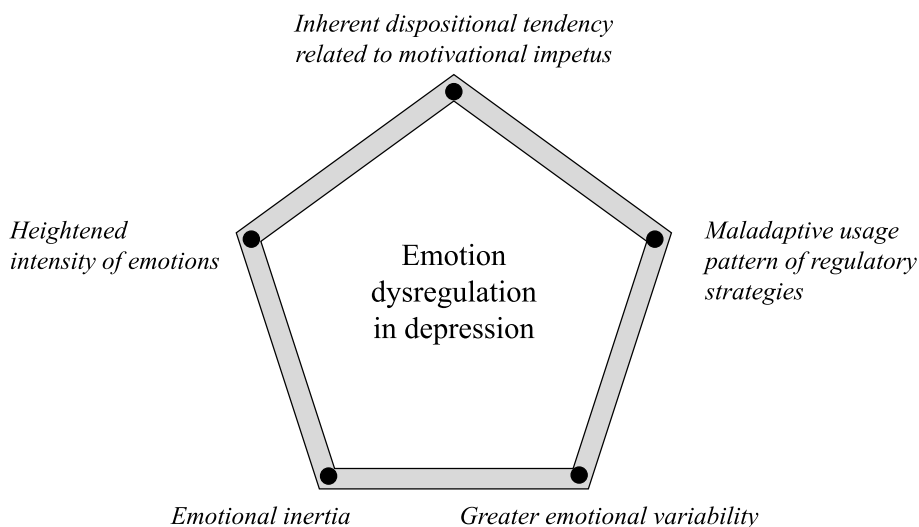


Fig. 3 Summary of the determinants influencing symptoms of major depression

mediate further improvements for psychiatric outcomes [18, 48]: examples include cognitive behavioral therapy approaches (CBT) [49, 50], acceptance and commitment therapy (ACT) [51], dialectical behavioral therapy (DBT) [52, 53], and acceptance-based behavioral therapy (ABBT) [54]. However, most research assessing treatment efficacy precludes making any decisions about clinical mechanisms essential for improving ER. This is because they examine the impact of non-ER-focused interventions or interventions to target ER as part of a comprehensive program [18, 48]. Due to the multi-component nature of the interventions, the specific components contributing to changes in ER remains unclear and whether the changes underlie improvements in other distressing symptoms has not yet been clarified. Thus, efforts to identify and inform the development of interventions leading to adaptive ER based on these studies are limited.

At present, patients who have distress disorders, such as generalized anxiety disorder (GAD), MDD, and particularly GAD diagnosed along with comorbid depression, often fail to respond well or experience sufficient gains from treatments: however, the reason for their lack of response is unknown [17, 55]. Between 50 and 80% of patients receiving interventions for emotional disorders achieve the status of “responder.” [17] Between 50 and 60% of GAD patients showed meaningful improvement in response to treatment with traditional CBT [55]. While ER-focused interventions, such as the Unified Protocol (UP) [56], Emotion Regulation Group Therapy (ERGT) [57], and enhanced CBT emphasizing ER [58] were found to be effective in improving ER, research investigating these remains limited [18, 59, 60]. No substantial changes were found in the essential dimensions of ER after the application of several ER-focused interventions, implying that these were not present in a sufficient dose to promote ER [53, 61, 62]. Further, recent research identifying treatment response predictors for ERGT showed relatively few significant predictors [63]. In particular, the findings from a study that examined a treatment designed to enhance inpatient CBT for depression suggest that the addition of ER skills to CBT may not sufficiently change ER, although improvements were noted in ER strategies and depressive symptoms [58]. Another problem arises from the manualized CBT protocols, which are distinct and complex to use [17, 64]. These protocols make it difficult to access and use CBT.

The limitations of the current interventions suggest the need for developing an ER-specific treatment. Designing more effective and targeted interventions requires a specific understanding of affective science to provide a broad framework for ER treatments. For example, recently, it has been identified that emotions can be generated and

regulated not only through a top-down process but also through a bottom-up process: [65] current models of emotion generation and its regulation are based on these two processes, which are opposed but interactive [66]. The top-down mechanism is based on a view that focuses on cognition, where either individuals’ goal states or cognitive evaluations are thought to influence the variations in their emotional responses [67]. These processes are mapped to prefrontal cortical areas. Meanwhile, bottom-up mechanisms refer to processes based on a stimuli-focused view: in this mode of processing, emotions are mostly elicited by perceptions [68]. In everyday life, emotion can be processed through interactions between the bottom-up and top-down mechanisms [69].

Most research to date, however, has focused on top-down ER strategies, and few studies have focused on bottom-up regulation procedures [65]. In particular, CBT-based treatments, which are mainstream psychotherapies, focus on instruction in an array of cognitive means of coping with emotions; CBT traditionally tends to deal more directly with cognitive rather than emotional processes. One top-down strategy is cognitive reappraisal, an active component of most CBT-based treatments [70]. However, studies suggest that relying primarily on this strategy may be less effective for certain disorders, including depression, than treatments employing a flexible approach [65]. Such an approach would be straightforward and essential for researchers as they synthesize different research results, such as findings concerning bottom-up ER and its clinical implications for the investigation of interventions.

One intervention approach to bottom-up experiential ER is art psychotherapy. This type of treatment, which targets emotion dysregulation, may hold promise for improving ER in cases of depression. Patients with depression can benefit from experiential ER that emphasizes bottom-up means of coping with their emotional experiences over the course of art-based ER intervention. This perspective is supported by behavioral and neurocognitive findings indicating difficulties in top-down regulatory processes in individuals with depression [71–74]. Research examining neural activities between individuals with and without depression indicated different patterns between them: when downregulating negative emotions, individuals with depression show bilateral prefrontal cortex (PFC) activation, whereas individuals without depression show left-lateralized activation [74]. When given an effortful reappraisal task, moreover, the relationship patterns of individuals with depression between activation in the left ventrolateral PFC and the amygdala are different from those of individuals without depression. These findings indicate that the pathophysiology of depression underlies struggles of downregulation [74].

Thus, it is vital to design a new intervention for depression that focuses not only on top-down ER but also on bottom-up ER. In particular, this study examines art-based ER in the form of a client-centered and experiential psychotherapeutic approach allowing patients to attempt top-down and bottom-up regulation. While pursuing active engagement in art-based ER practices, patients can process their emotional experiences in a way that produces greater fine-tuning and depth. Art-based treatment is open and non-interventional as well as less demanding cognitively, enabling it to reach a diverse population with depressive symptoms. More promisingly, art-based ER primarily deals with visible and tangible works leading to visual representations. Emotional memory is perceptual [75], implying that art-based practices can influence its retrieval and manipulative process: the artworks that patients make in treatments are visual representations that are identical or similar to their emotional experiences. Importantly, creation involves colors, images, and spaces acting as new stimuli, allowing patients to manipulate and generate new emotions through a bottom-up process. As processes of emotion generation interact with those of ER [67], an art-based experiential approach can facilitate adaptive ER, potentially benefiting individuals who have emotional dysfunction.

However, few studies have explored ER in depression within the field of art psychotherapy [76]. The therapeutic strategies applied in relevant studies [77–79] are not explicitly identified or targeted with respect to the mechanisms of ER. For instance, earlier literature tested the effects of art therapy on ER in psychiatric disorders; most of these approaches focused on improving psychopathological symptoms related to specific disorders and considered ER to be a secondary therapeutic outcome. Thus, we identified a need to develop an effective art-based

intervention specifically targeting emotion dysregulation in major depression.

Step 2: Formulation of change objectives

The second step required the specification of intervention goals, which involved moving from understanding what influences depressive symptoms, especially in terms of emotional abnormalities in depression, to clarifying what needs to be changed. Based on the needs assessment, the overall expected outcome was “a decrease in depressive symptoms and an improvement in ER.” In this process, the analysis of the determinants in Step 1 resulted in selecting key determinants to target, which were provided by a comprehensive review of the empirical literature and research evidence. It is difficult to understand generative and regulatory emotion processes that are enacted internally without the instigation of extrinsic stimuli [80]. Thus, it can be challenging to identify the right determinants to target and design an effective treatment that addresses problems related to ER. Based on our review, we determined and chose four important and changeable determinants and further divided them into five key determinants (see Table 1).

To apply IM, the construction of matrices of change consisting of performance and change objectives forms the basis for program development [20, 81]. Overall, the program objectives were subdivided into performance objectives expected to be accomplished by the target group in the proposed intervention. While drawing on the key determinants and performance objectives, more general objectives, namely, change objectives, were formulated. The result of Step 2 is this change matrix, which further forms the basic factors for designing the intervention for major depression.

Table 1 Change matrix of intervention objectives proposed for patients with major depression

Key determinants selected	<ul style="list-style-type: none"> • Heightened intensity of emotions • Patterns of avoidance of emotional experiences • Overuse of maladaptive ER strategies (e.g., rumination, dampening) • Limited use of adaptive ER strategies (e.g., positive rumination) • Heightened emotional instability of negative affect (NA)
Performance objectives in treatment	<ol style="list-style-type: none"> 1. The patients understand the concept of ER and the importance of identifying their habitual reactions 2. The patients gain awareness of and self-monitor their emotional responses 3. The patients diminish their rigid pursuit of avoiding intense emotions 4. The patients reduce the frequency of maladaptive ER strategy use 5. The patients identify adaptive and optimal ER strategies and enhance both their frequency and quantity
Change objectives	<ul style="list-style-type: none"> • Breakaway from an avoidant or inhibited response tendency • Increased awareness of emotional reactions • Decrease in maladaptive ER strategy use • Increase in the ability to modulate emotional expression according to contextual demands

Step 3: Theory- and evidence-based strategies selection

In IM, Step 3 entails selecting theoretically grounded and evidence-based methods and strategies. For this process, we first conducted a comprehensive review of theories and empirical studies for therapeutic strategies, including the following characteristics: (i) they need to be confirmed as an efficient ER strategy based on empirical research evidence; (ii) they need to be effective not only in decreasing depressive symptoms but also in improving ER capacities of patients; and (iii) they can be translated into art-based practices. In iterations of reviewing theories related to and research evidence with regard to emotion regulatory strategies, we identified appropriate, theoretically sound therapeutic strategies for at least one program target.

Once an ER method was selected, we translated this method into art-based emotion regulation (ABER) strategies for practical applications. *Practical applications* refer to the practical translation of the chosen behavior change methods [19–21, 81]. The end product of Step 3 is an initial set of theory- and evidence-based strategies selected and translated to address emotion dysregulation in major depression. Table 2 lists the strategies with supporting evidence and applications: art-based distraction, art-based positive rumination, art-based self-distancing (SD), and art-based acceptance. Based on an integrative view of emotional processing, which posits interactions between top-down and bottom-up systems [67, 69, 82, 83], these strategies aim to modulate emotions through the use of top-down and bottom-up mechanisms.

In particular, as art-based ER involves visual-spatial processing that could exert influence as new sets of stimuli, this approach could lead to a more experiential bottom-up ER. For instance, distraction and cognitive defusion are usually considered cognitive forms of ER; however, both are translated and applied to art-based strategies. Individuals' performance in art-based ER would differ from that on a given cognitive task, as their immersion experiences in the artistic and creative process involve the generation of colors, images, and spatial features, which may elicit new bottom-up processing. This may be associated with the superior ER effects of art-based distraction, as shown in some studies that compared the ER effects of artistic activities with those of non-artistic activities, such as completing verbal puzzles [98–100].

In addition, art-based SD promotes intuitive and experiential ER. Individuals are trained to adopt a self-distanced perspective in some treatments while reflecting on their emotions, such as mindfulness-based stress reduction (MBSR) and ERT. They meditate to take a decentered stance. Art-based SD may help those who have difficulty creating an internal distance. As individuals

create visual forms of their inner feelings and thoughts, a spatially generated distance from the artworks representing their experiences allows them to adopt and maintain a more self-distanced perspective. As such, art-based SD is more intuitive but requires less mental energy. Importantly, this art-based experiential distancing may reconstruct individuals' appraisals by facilitating a bottom-up mechanism.

Step 4: Program development

Step 4 concerns creating an actual program plan, leading to the ABER intervention model proposed in the current study. The intervention's elementary components, organization, and structure were created based on the findings of the preparation steps (Steps 1–3). Once the list of therapeutic strategies and their practical applications was generated, we designed a structured intervention framework that would be feasible and realistic to deliver in primary care settings.

The intervention framework developed in Step 4 is based on the process model of ER [7], supported by considerable empirical research [101–103]. Based on the extended model, a series of steps involved in the process of regulation with different ER strategies are considered while designing the conceptual framework. Accordingly, the primary areas of the intervention involve emotion perception, attention, and cognition. We developed specific art-based ER strategies, focusing primarily on antecedent- rather than response-focused regulation. Further, this intervention is meant to complement the process model in a framework that is designed to apply one or more strategies in a single session: this would be ideal for improving ER in real life, as current research on ER has found that people generally try multiple strategies simultaneously [104], whereas the process model examines a within-situation context, within which a single ER strategy is utilized [12]. In addition, we find that this treatment will be effective in improving ER as it attempts both top-down and bottom-up ER: actively engaging in artworks through the use of the body, a patient can apply experiential self-focus [64]. In treatment with art-making, patients can be provided with sufficient time and space to find personal meaning in their experiences and process emotions, which enables them to achieve change.

Table 3 presents an overview of the proposed intervention frameworks. As shown, we designed two frameworks to guide the intervention: an individual framework for short-term intervention and an integrative framework for long-term intervention. Each style of the ABER model draws on a different implementation design to build the framework, and each model has slightly different aims. In Step 4, the advisory board reviewed the draft frameworks, including the determinants, performance

Table 2 Summary intervention methods selected, supporting evidence, and applications of ABER

ER strategies	Empirical evidence	Applications
Distraction	<p>Distraction successfully reduces the unpleasantness of painful stimuli and decreases the activation of brain regions related to pain [84]</p> <p>Distraction reduces sadness [85], anger [86], and emotional response indices, such as subjective intensity of emotion and corrugator muscle activity [87]</p>	<p>Art-based distraction is applied to redeploy a patient's attention away from negative mood-inducing situations toward positive thoughts and emotions through active engagement in art-making</p> <p>Either a structured or unstructured task can be used for this purpose, depending on the patient's level of functioning and behavior</p> <p>When employing art-based distraction as an ER strategy, it should be noted that it is not a simple task but a goal-specific ABER strategy to target the patients' ruminative responses</p>
Distancing	<p>Distancing results in lower experiences of depressed emotion and ruminative responses when reflecting on unpleasant experiences [89]</p> <p>An individual who engages in spontaneous self-distancing (SD) tends to report less use of strategies associated with avoidance [90]</p>	<p>Art-based SD aims to distance a patient from their emotional experiences through the process of visualization during intervention</p> <p>During treatment, patients are encouraged to consider their emotional experiences in a tangible and easily comprehensible manner through colors, textures, and shapes</p> <p>This promotes an internal focus on spatial distance by creating visual representations of thoughts, feelings, and urges rather than linguistic representations and by observing them from an experiential perspective</p>
Positive rumination	<p>Positive rumination has been associated with a stronger positive affect (PA) [92] and inversely with depressive symptoms [93]</p>	<p>Art-based positive rumination is designed to intervene in and alter depression-related ruminative styles</p> <p>The patient is encouraged to reflect on their overwhelming thoughts and feelings in their daily lives through an imagery diary</p> <p>When discussing any visual representations with a patient, therapists should detect rumination and challenge the patient's cyclical thoughts</p>
Acceptance	<p>Acceptance has been shown to be related to less experience of fear, avoidance-related behaviors, catastrophic thinking, and better recovery from negative emotions than suppression [95, 96]</p>	<p>The patient is encouraged to practice art-based acceptance that promotes the use of symbolic thinking through art-making, which is devoted to a new approach to emotional experiences</p> <p>Instead of verbally examining negative experiences, exploring emotions with images and metaphors is considered to be less psychologically threatening [97]</p>

Table 3 Overview of the two intervention frameworks

	Individual framework	Integrative framework
Objectives of the model	<ul style="list-style-type: none"> Producing initial or short-term behavioral changes in ER 	<ul style="list-style-type: none"> Fostering adaptive motivational responses and flexibility Producing behavioral changes in ER when a focused and long-term intervention is available
Phases of intervention	One phase	Three phases: Phase I Phase II Phase III
Duration of intervention	1–4 weeks	6–12 weeks <ul style="list-style-type: none"> a 6-week course: Phase I(1 week) – Phase II(4 weeks) – Phase III(1 week) a 8 to 12-week course: Phase I(2 weeks) – Phase II(4–8 weeks) – Phase III(2 weeks)
Duration of the individual session	1–1.5 h	1–2 h
Expected outcomes	<ul style="list-style-type: none"> Increase in the quantity and frequency of adaptive ER strategies Decrease in the use of maladaptive ER strategies 	<ul style="list-style-type: none"> Increase in patient motivation for treatment Increase in the quantity and frequency of adaptive ER strategies Decrease in the use of maladaptive ER strategies Increase in cognitive-behavioral flexibility Achievement of greater emotional clarity

and change objectives, and therapeutic strategies. The advisory board acted as a support group throughout the review process, helping tailor the program to the target population. In response to the board’s reviews, supplementary resources were added.

Individual framework

First, a plan for an individual framework was devised that accounted for the scope and phase of a short-term intervention. As shown in Fig. 4, this framework focuses on producing initial or short-term behavioral changes pertaining to achieving short-term clinical efficacy. That is, the individual model does not aim only at emotional changes in patients, such as increases or decreases in specific emotions. The therapeutic aim is not set in an emotion-specific manner, but in terms of effectiveness, it relates to the use of regulatory strategies [105]. Accordingly, an expected outcome is to increase the quantity and frequency of adaptive ER strategies. Patients are trained in rudimentary ER skills, including one or several combination ABER strategies, as designed in the previous step. These practices aim to enhance attentional, followed by cognitive control. The expected duration of individual sessions is around 1–1.5 h.

Integrative framework

While an individual framework comprises a single phase, an integrative framework includes stepwise sequential phases. In addition to skill development in the individual treatment, three phases of the integrative model are designed to foster adaptive motivational responses and cognitive-behavioral flexibility, which enables patients

to achieve greater emotional clarity [106]. In the integrative treatment, all three phases are performed for 6–12 weeks.

The first phase of the integrative model begins with psychoeducation, in which the patient is taught the concept of ER and the importance of identifying his or her habitual reactions, such as in terms of rumination and dampening [91], that have characterized his or her life. This therapeutic process is important because ER is an automatic process requiring the consideration of motivation [107]. Psychoeducation regarding ER and monitoring patients’ responses to emotional experiences precede the skill development procedure. For instance, for patients’ self-monitoring, retrospective self-report questionnaires can capture data on ER skill use. While these methodologies are easy to use and cost-efficient [108], they are demanding tools for use in capturing natural fluctuating patterns in ER [109]. As an alternative, ecological momentary assessment can be used in treatment to capture situational context and adaptiveness of the skill use [108]. In addition to patients’ self-monitoring, a psychotherapist should monitor their emotional responses during and between therapy sessions: psychotherapists function as human raters. Because self-monitoring may not be feasible for all patients, assessing the typical patterns with which patients use maladaptive emotion regulatory strategies is important. Specifically, therapists need to assess a patient’s ER repertoire: the quantity of ER strategies, the frequency of strategy use, and how the patient’s strategy use changes.

The second phase entails adopting and implementing ER strategies with processes resembling those of the individual model. These processes entail the selection

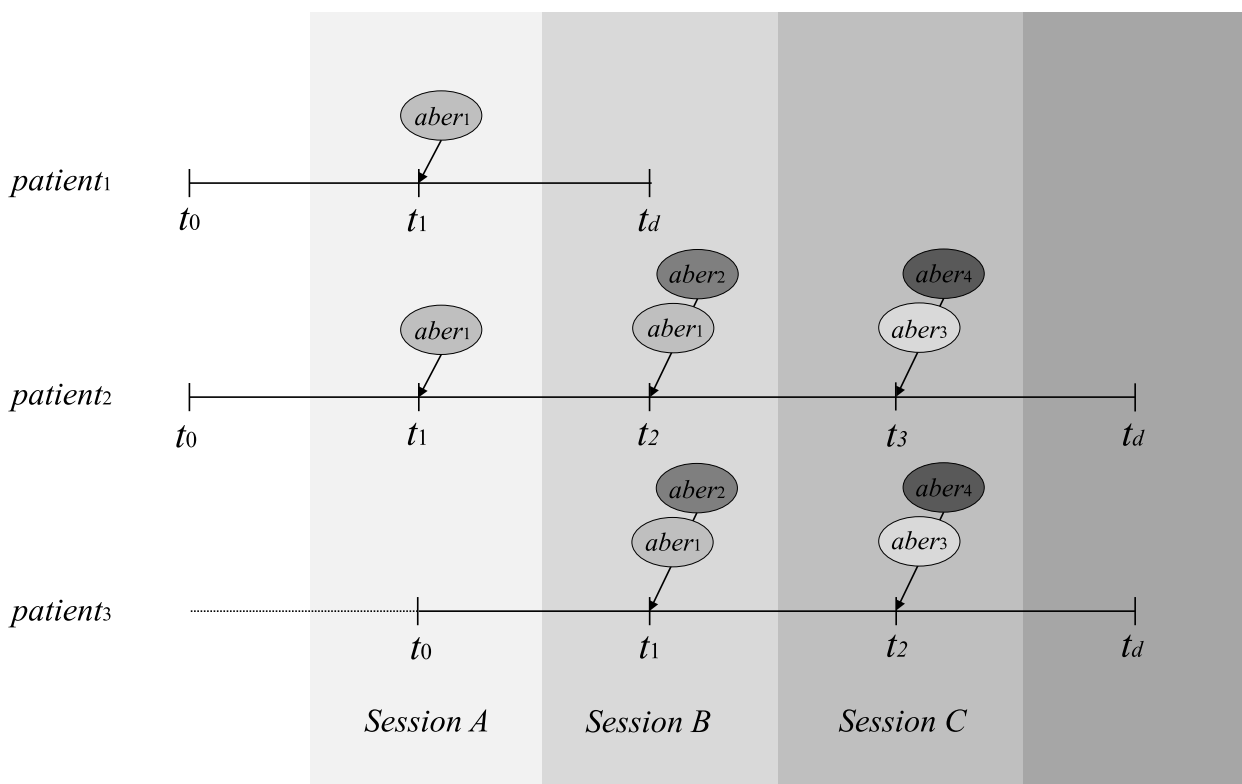


Fig. 4 Individual intervention model diagram. Noted. The panel shows the individual intervention model in an inpatient setting as an example: each patient (patient_i) has a different time of admission (t₀) and inpatient discharge (t_d). Thus, the number of participating patients can differ per session. During the hospital stay, patients are trained in rudimentary emotion regulation (ER) skills, including one or a combination of several art-based ER strategies (aber_i). The application of the therapeutic strategies is flexible: it depends on the patient’s cognitive functions, depressive symptoms, and severity of the symptoms. The time of inpatient discharge (t_d) affects each patient’s treatment duration

and repetition of adaptive strategies. They differ from the individual model in that the duration of Phase II can vary from one patient to another depending on the severity of depressive symptoms and the frequency of maladaptive strategies used. The ER practices delivered in Phase II are art-based tasks through which therapists and patients explore and try adaptive strategies. As shown in Fig. 5, the intervention program includes four ABER strategies selected and translated in Step 3: art-based distraction, art-based SD, art-based positive rumination, and art-based acceptance. The patients work with therapists in 4–8 1.5-h sessions to engage in art-based practices.

Finally, the integrative framework includes a third phase for evaluation. While the previous sessions in Phase II focus on skill development, the sessions in Phase III focus on assessing changes in patients. All individual progress in ER is tracked and monitored. In this task, therapists help patients assess changes in their emotion-regulatory skill use and their achievements in terms of self-perception, effectiveness, and adaptiveness. Patients are given opportunities to take a broad view of the changes in their artworks during all treatment phases.

Furthermore, patients receive a few tasks as homework to briefly review their strategy use in daily life from the beginning of the treatment until the current moment. The review process helps them assess their progress and supports their strengthening. It takes 6–12 weeks to complete the integrative treatment course, depending on the clinical impression. For instance, the duration of Phase II is expected to take 4–8 weeks, according to the clinical impression. A therapist or clinician renders his or her impression regarding the degree of the patients’ severity of depressive symptoms, use of maladaptive ER strategies, willingness to participate in the intervention, and insight into their treatment.

Step 5: Adoption and implementation

Implementation is an essential aspect of program development. In Step 5 of IM, the focus is on planning the adoption and implementation of the proposed intervention. This process is required at the environmental level [21] and ensures successful adoption and sustainable use in collaborating organizations. Thus, pilot tests can be conducted to gain practical insights into implementation

Phase I	Preparation	<ul style="list-style-type: none"> • Goal setting and process overview • Emotional response-monitoring • Understanding emotion and ER 	One to two weeks
Phase II	Regulation skills training	<ul style="list-style-type: none"> • <u>Manipulating experiences</u> <ul style="list-style-type: none"> - Art-based distraction - Art-based self-distancing - Art-based positive rumination - Art-based acceptance 	One to eight weeks
Phase III	Evaluation	<ul style="list-style-type: none"> • Progress monitoring • Support adaptation 	One to two weeks

Fig. 5 Summary steps and components for the integrative intervention model

decisions and refine the intervention. Using a PAR framework, we pilot-tested the individual model to ensure that the intervention is appropriate and helpful for patients. This PAR pilot study was performed to inform future practices while connecting intervention research with actual action in a primary care setting.

The advisory group’s results, which indicated that the intervention needed to be sufficiently pliable to be used in a variety of primary care settings, informed and supported the step for pretesting. Implementation was prepared in a primary care setting, in which the program was pretested with a steering group of psychiatrists, nurses, and an art psychotherapist. Two clinicians were in charge of informing the intervention program and facilitating patient involvement. The therapist, who had received appropriate training and instruction, was responsible for delivering the intervention and supporting all practical aspects of patient engagement. With support from the therapist, the patients were in charge of applying one or a combination of two strategies in therapeutic sessions.

We performed this initial testing in a psychiatric ward in Seoul. Between February 2023 and February 2024, during the first two phases of the pilot testing, approximately 24 sessions were conducted, and 45 inpatients, including 16 patients with depressive disorders, voluntarily participated in the program. At the end of each session, the participants were asked to report their experiences through free narratives and complete a short questionnaire survey (quantitative and free-text comments) that provided additional information regarding their involvement. The mean time expenditure for the patients was 1.1 h (SD: 18.0; range: 0.5–2). Patients’ emotional experiences were reflected in their artworks, and Fig. 6 shows a short overview of their art products. The detailed findings from

these pilot trials are outside the scope of the IM protocol and will be available in a future publication.

Step 6. Evaluation plan

The sixth step of IM is the planning of evaluation strategies to assess the potential impacts of the proposed intervention [20]. For this purpose, we designed two phases based on a PAR framework: patient feedback and expert feedback. The rationale for this plan was that comprehensive evaluations could investigate the necessity of refinement and what is needed to produce a more feasible and effective intervention. In particular, we expected that the engagement of patients as well as health professionals in the evaluation process would integrate the organizational perspective into patient-oriented quality improvements. From these two phases, we developed questions and measures for evaluation, conducting preliminary PAR studies to determine the feasibility and efficacy of the complete program. Table 4 presents the evaluation strategies for gaining patient and expert feedback. Meanwhile, Table 5 presents an overview and timeline of PAR 2 and PAR 3.

First, we developed a set of patient-reported outcome measures to obtain patient feedback. Quantitative assessments of treatment satisfaction, perceived helpfulness of treatment, and perceived difficulty were conducted following the end of a therapeutic session. Patient evaluations must be carried out regularly during treatment to assess the efficacy of the integrative model. At the end of the program, unstructured or semi-structured interviews are recommended to explore patients’ experiences of the treatment process. In addition, we planned a two-phase mixed-methods study to obtain feedback from participating healthcare professionals using an online survey



Fig. 6 Examples of the art products of the participating patients with depression. Noted. Figure 6 briefly outlines patient engagement through their artworks made during the treatment sessions in the first pilot phase: a shows an artwork a patient made in a treatment session, which applied art-based acceptance; b shows an artwork showing a patient's reflection on his experience, which applied art-based self-distancing and acceptance; c and d show artworks in which patients apply art-based positive rumination and distraction. Different art materials were provided in each session depending on the ER strategies used. The art-based practices of ER promoted relaxation and expression of the patient's inner feelings and thoughts

and focus group interviews. The assessments included process measures, such as perceived difficulty, program appropriateness, and recommendations for improvements to its implementation on a professional level. A web-based survey was disseminated among clinicians and nurses to assess the feasibility of the intervention. Together, this enabled us to increase the time efficiency and cost-effectiveness of the evaluation process.

Feasibility was assessed in five ways. First, the feasibility with which patients participated in the program was described. In our preliminary study, for instance, we calculated the percentage of patients approached for program participation relative to those who did not. Second, the feasibility of retaining patients in a treatment session was reported. To capture the feasibility of retention in treatment, we calculated the percentage of patients who failed to complete treatment compared with the percentage of those who completed it. Third, the feasibility of administering treatment was measured with a self-reported survey of patients' perceived difficulty in participation and a survey of healthcare professionals' perceived difficulty in implementation. To report the feasibility of administering treatment, we calculated the mean hours a patient spent in completing

treatment. In addition to feasibility, acceptability was operationalized in three ways: a quantitative self-report survey of patient satisfaction, patient perceptions of helpfulness of treatment, and patient willingness to recommend program participation were used. In our preliminary study, we developed responses for the patient survey and calculated the means and standard deviations for each item.

We received patient feedback in the first two pilot phases (PAR 2), and the results showed that the intervention program was feasible and acceptable for implementation in the primary care setting (the mean scores were as follows: Treatment satisfaction = 4.82, Perceived helpfulness of treatment = 4.57, Perceived difficulty = 4.45). The patients provided further recommendations for improved intervention in free-text comments. In addition to this patient feedback, we began conducting PAR3 in February 2024. The feedback research is being conducted through an online questionnaire that includes multiple-choice questions and open-ended questions, with focus group interviews being conducted virtually through Zoom. The results for PAR 2 and PAR 3 will be reported in separate articles.

Table 4 Evaluation strategies mapped to gain patient and expert feedback on the initial testing

Indicator	Level			Measure
	Patient	Provider	Health care professionals	
Effect outcomes				
Pleasure	x			The Self-Assessment Manikin (SAM) [110]
Arousal	x			The Self-Assessment Manikin (SAM) [110]
Dominance	x			The Self-Assessment Manikin (SAM) [110]
Process outcomes				
Acceptability				
Program satisfaction	x			Quantitative self-report survey (5-point Likert scale) Qualitative interviews
Perceived helpfulness of treatment	x			Quantitative self-report survey (5-point Likert scale) Qualitative interviews
Willingness to recommend program participation	x			Quantitative self-report survey (5-point Likert scale) Qualitative interviews
Feasibility				
Perceived difficulty of participation	x			Quantitative self-report survey (5-point Likert scale) Qualitative interviews
Perceived difficulty of implementation			x	Online survey Focus group interviews
Patient participation rates		x		Quantitative report
Patient dropout rates		x		Quantitative report
Hours to complete practices		x		Quantitative assessment
Program appropriateness				
			x	Online survey Focus group interviews
Recommendations for improvement				
	x			Qualitative interviews or free-text comments
		x		Online survey
			x	Focus group interviews

Provider, indicates the psychotherapist as an implementer; Health care professionals, indicates clinic staff including clinicians and nurses in the department of psychiatry; x, indicates which levels of the group asked for the feedback

Discussion

In this paper, we proposed conceptual frameworks for an intervention that targets emotion dysregulation in depression. IM was used as the conceptual protocol to develop the intervention. To the best of our knowledge, this is the first art-based ER intervention incorporating previous theories, research evidence, and review data in relation to affective science and intervention research, combining PAR components with IM. We developed the intervention following the rationale and stepwise process of IM, which identifies theory- and evidence-based strategies to address key barriers to ER. In addition, to evaluate the developed intervention, preliminary PAR studies were conducted, including the acceptability of the trials and the ABER intervention to patients; the rate of recruitment, attendance, and attrition; perceived difficulties in intervention implementation; and psychological outcomes. Consequently, the intervention is theoretically underpinned and

supported by empirical evidence regarding ER and the results of our pilot studies.

The current study benefits from integrating the PAR approach into the IM framework in two ways. First, using PAR studies in the IM resulted in the cogeneration of knowledge among academic researchers, implementers, and the intended participants. PAR ensured experiential knowledge to deliver content that addressed difficulties in ER in collaborative partnerships. Another contribution was enhancing the feasibility and acceptability of the proposed intervention. In particular, preliminary PAR studies helped investigate whether modifications were needed before the intervention’s adoption. Even though IM is a time-consuming process, the use of PAR made it more cost-effective and time-efficient.

In addition to these strengths, it is crucial to acknowledge and affirm the study’s limitations. First, the current study offers only preliminary evidence for the given conceptual framework. Although the proposed intervention

Table 5 Overview and timing of PAR 2 and PAR 3

Years	Months	Process	Number of patients
2022	DEC	• Coordination and communication with clinicians to develop a protocol for pilot testing	
2023	JAN		
2023	FEB	• Patient recruitment and intervention adoption	N = 23; n = 10
	FEB	• Intervention implementation	
	MAR	• Coordination and communication with healthcare providers and clinicians to optimize the implementation	
	APR	• Reporting of treatment results	
	MAY	• Refinement of the implementation protocol	
	JUN		
	JUL		
	AUG	• Preliminary evaluation of the feasibility and acceptability of the first pilot phase of implementation (Feb 2023–Jul 2023)	
	SEP		
2023	OCT	• Patient recruitment and intervention implementation	N = 22; n = 6
2024	NOV	• Reporting of treatment results	
	DEC	• Coordination and communication with healthcare providers and clinicians to optimize the second pilot phase	
	JAN		
	FEB		
2024	FEB	• Face-to-face meetings with clinic staff to overview the program adoption and implementation process and discussions on the feasibility of the intervention	
		• Online survey for expert feedback (PAR 3; in progress)	
	MAR	• A focus group interview (PAR 3; in progress)	

N, number of participating patients; n, number of participating patients diagnosed with depression

may precisely target emotional dysfunction in depression, such as in the restrictive use of adaptive ER skills with repetitive use of maladaptive strategies, the integrative and individual frameworks of ABER have not been evaluated through randomized clinical trials. As the current study pilot-tested the intervention in an inpatient setting that served an acute, transdiagnostic population, implementers could extend the use of these frameworks by performing a fine-grained analysis of treatment contexts (e.g., by adapting the model for depressed outpatients in primary care). As such, the intervention must be examined and refined on the basis of the results of empirical studies on multidisciplinary design. In addition, this article did not examine the therapists’ capability of delivering treatment, fidelity of implementation, and feasibility of measuring tools. Intervention researchers interested in these variables are encouraged to extend our models by testing the broad contextual variables that influence its process. Similarly, further research is required to investigate standardized forms of assessment in treatment (e.g., a measurable rating scale for patient monitoring) to increase the efficiency of the intervention.

Conclusions

This article proposes empirical and theoretical intervention frameworks that can improve ER in depression. This IM study is unique, as the development process incorporates PAR components. Moreover, the intervention consists of four art-based regulatory strategies that

enrich the present literature on intervention research targeting dysfunctional ER in major depression. Our participatory action studies demonstrate that, in a primary care setting, the individual protocol is feasible and acceptable for implementation. This result represents a potential step forward toward filling a gap in current mental health treatments for patients with MDD. Despite the tiresome and time-consuming process of intervention development, the application of IM augmented by PAR is helpful in optimizing chances for an effective behavior change. Further testing is required to assess the impact of the therapeutic program proposed in this study.

Abbreviations

- ABER Art-based emotion regulation
- CBT Cognitive-behavioral therapy
- ER Emotion regulation
- ERGT Emotion Regulation Group Therapy
- GAD Generalized anxiety disorder
- IM Intervention mapping
- MBSR Mindfulness-based stress reduction
- MDD Major depressive disorder
- PAR Participatory action research
- SAM The Self-Assessment Manikin
- SD Self-distancing
- WHO World Health Organization

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Authors' contributions

ML contributed to plan and design the study with support from the rest of the study team. YT registered the trial. ML collected, and analyzed participant data. ML drafted and edited the manuscript. All authors reviewed and/or approved the final manuscript for submission.

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Availability of data and materials

The author confirms that the data generated or analysed during this study are included in this published article; however, raw datasets are not publicly available due to local legal restrictions. Since the data being generated by PAR2 and PAR3 are outside the scope of the current intervention mapping study, they are available elsewhere.

Declarations

Ethics approval and consent to participate

The ethical approvals for the current research were obtained from the Institutional Review Board of Kangdong Sacred Heart Hospital, PAR2 (IRB no. 2023–12–002), and PAR3 (no. 2024–02–019). In PAR2, informed consent was exempted due to its retrospective nature. Nevertheless, all patients who participated in the therapeutic sessions were requested to sign a consent form for later use of their artwork for educational and research purposes. In PAR 3, informed consent was obtained from the healthcare professionals, including physicians and nurses, who were involved in the program.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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