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Stressful life events and passive behavioral patterns in women with major depressive disorder: a mixed method analysis nested in a clinical trial

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Abstract

Background Women are more vulnerable to presenting with major depressive disorder (MDD) as they seem more sensitive to stressful life events (SLE). Few studies describe the effect of SLE on the development of avoidant/passive behavioral patterns (PBP) of MDD. Understanding the relationship between SLE and PBP is essential for the clinical management of MDD. Here, we aim (1) to describe and categorize the perceptions about SLE, emotional experience, and PBP in women with MDD and (2) to discuss the PBP according to evolutionary and behavioral processes. This mixed-method study, including qualitative and quantitative analyses, was nested in a clinical trial with 76 patients. We selected a sample of 18 female patients, randomized to behavioral activation therapy (BAT). In the first sessions, we interviewed the patients about SLE, emotional experience, and PBP perceived during their current depressive episode. The reports were submitted to content analysis and categorized under similar themes. We performed bivariate Spearman correlations to test the strenghts of associations between depressive symptoms (HAM-D), anxiety symptoms (BAI), disability (SDS), and cognitive distortions (CD-Quest).

Results In our sample, the most frequent SLE were romantic relationship problems and family problems. The patients most reported emotional experiences were sadness, discouragement, and anxiety. The most common PBP categories were getting isolated, stopping doing activities, and ruminating.

Conclusions Women frequently perceive interpersonal, family, and affective problems as triggers of depressive episodes. The most common passive patterns include isolation, stopping doing activities, and ruminations. The evolutionary functions of PBP are to keep the organism passive, avoiding energy expenditure, and risk exposure in the face of a chronically stressful environment with few opportunities for reward.

Keywords Major depressive disorder, Woman, Stressful life events, Behavioral activation, Biopsychology, Trial-based cognitive therapy

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Introduction

Major depressive disorder (MDD) is a disabling condition that affects multiple areas of life, with core symptoms including depressed mood, anhedonia, changes in sleep, appetite, and energy, negative thinking, and suicidality [1, 2]. MDD is also among the top 10 clinical conditions that produce the most significant burden of disease, leading up to 15% of patients to die from suicide [3, 4]. Antidepressants, cognitive-behavioral therapy (CBT), behavioral activation therapy (BAT), and interpersonal therapy (IPT) are the first-choice treatments for MDD [5].

Although men and women can both develop MDD, women are two to three times more likely to develop the disorder due to several vulnerability factors, including changes in the ovarian hormone cycle, greater sensitivity to interpersonal stressors, and greater exposure to psychosocial risks such as neglect, child maltreatment, and isolation [6, 7]. While research regarding stressful life events (SLE) and MDD exists, studies exploring women's experiences of SLE and passive behavior patterns (PBP) are sparse, despite the fact that PBP is a characteristic of the disorder [8, 9]. PBP is also known as passive coping, avoidance patterns, and inactivity [10-12].

The core symptoms of MDD are often followed by PBP [8, 9] for example: staying in bed, withdrawing from social life, and ruminations [10]. PBP appears to arise after ineffective escape and avoidance responses to chronic and uncontrollable stressful environments [11, 12]. Experimental stress conditions in animal models of depression induce some of the following depressive-like behaviors, including inactivity in forced swimming and tail suspension tests, reduced sucrose consumption, increased latency to avoid shock, and decreased frequency of sexual, grooming, and competitive behaviors [13–15]. The main evolutionary and behavioral functions of PBP are to escape from environmental stressors and to avoid the unnecessary expenditure of metabolic resources [16, 17].

Behavioral and psychological models of depression suggest that emotional symptoms and PBP are triggered by chronic stressors, which are adaptive in the short term. However, when PBP become more frequent, its prevents contact with positive reinforcers leading to increased emotional reactions and even more PBP, perpetuating the depressive cycle [18, 19].

Since MDD is more prevalent in women, that PBP is a typical characteristic of this disorder, and that data on this topic are insufficiently systematized, this study aimed to categorize the perceptions of women with MDD about SLE, emotional experience, and PBP. The study's findings are discussed in light of the biological, evolutionary, and behavioral models of MDD.

Method

Study design and participants

This study is a secondary analysis, using a mixed-methods approach nested within a randomized clinical trial (RCT) [5]. The RCT aimed to compare the efficacy of trial-based cognitive therapy (TBCT), BAT, and treatment as usual (TAU) with antidepressants, in treating 76 patients with MDD. The majority of the sample was composed of females [n = 66; (86%)]. To achieve the objectives of the present study, we only analyzed data from female patients who where randomized to BAT and completed at least the first psychotherapy session (n = 18). During this session, case formulation was performed, and data on SLE, emotional symptoms, and PBP were collected.

The inclusion criteria of the RCT were patients of both sexes aged between 18 and 60 years with a current diagnosis of MDD, a score above 15 on the Hamilton Rating Scale for Depression (HAM-D) [20] or above 20 on the Beck Depression Inventory (BDI) [21], and who had been on a stable dose of antidepressants for at least 2 months. Patients with bipolar disorder, psychotic symptoms, and substance use disorder were excluded. The patients were seen individually and, collaboratively with the psychotherapist, completed BAT interventions developed for the RCT [5]. The sessions were audio-recorded. In the present study, we included female patients randomized to BAT who attended at least the first psychotherapy session.

Recruitment occurred in Salvador, Brazil, from 2015 to 2017 and was done through different sources: outpatient mental health clinics, psychiatry residency programs, radio, newspapers, and the Internet. This RCT was registered at clinicaltrials.gov (NCT02624102) and was approved by the Research Ethics Committee of the Instituto de Ciências da Saúde da Universidade Federal da Bahia, Brazil (CAAE 44.663.315.4.0000.5662).

Procedures and measures

In this secondary analysis, we describe the sociodemographic and clinical characteristics of the 18 female patients. The diagnosis of mental disorders was made with the Mini International Neuropsychiatric Interview (MINI-plus) [22]. Depressive symptoms were assessed with the HAM-D (17 items) through the semi-structured interview (GRID-HAM-D) [23] conducted by an evaluator blinded to the intervention group. HAM-D scores above 15 indicate moderate depressive symptoms and scores above 19 indicate severe depressive symptoms. The Beck Anxiety Inventory (BAI) [24] was used to assess anxiety symptoms, and scores above 15 indicate moderate symptoms, and above 25 indicate severe symptoms. The level of disability was assessed with the Sheehan Disability Scale (SDS) [25], applied by an evaluator blinded to the intervention group. SDS scores range from 0 to 30, and higher scores indicate more significant functional impairment in household activities, social relationships, and work. To assess the quality of life, we used the World Health Organization Quality of Life scale, abbreviated version (WHOQOL-BREF) [26, 27], a selfadministered questionnaire that assesses the level of life satisfaction in the psychological, environmental, social, and physical domains. The Cognitive Distortions Questionnaire (CD-Quest) [28, 29] was used in a self-applied form to assess the presence and severity of cognitive distortions. The CD-Quest consists of 15 items, with scores ranging from 0 to 75. Scores≥25 indicate moderate intensity, and scores \geq 35 indicate severe intensity. These assessments were conducted before the start of treatment, reflecting the baseline data of the patients.

The 12-session BAT protocol was based on adapting two clinical manuals [19, 30] and is described in Hemanny et al. [5, 31]. Patients' perceptions were collected in the first and second sessions when the therapist: (1) asked about patients' problems and (2) presented the behavioral model of Depression adapted from Martell et al., [19, 32] (Fig. 1) and asked semi-structured questions about the premorbid phase, possible triggers of MDD, emotions/feelings, and PBP using a semi-structured interview that was developed by us (Table 1). The therapist would draw or present a printed sheet containing Fig. 1 and explain it, asking the patient to write and add information.

Data analysis

As this was a mixed-method study, we used quantitative analyses to describe the socio-demographic and clinical data using descriptive statistics such as frequencies, means, and standard deviation. For the qualitative study, we conducted a content analysis where we transcribed the sessions and categorized and quantified the reports. The aim of the qualitative study was to explore the descriptive characteristics of the investigated phenomena [33–35]. Patients' and therapists' notes taken during sessions were used as data to categorize patients' perceptions. The reports about SLE, emotional experience, and PBP were grouped into thematic categorizes and discussed in light of the specific literature. Four psychologists independently quantified and categorized the reports and then worked towards a consensus. We conduct a condensation of meaning to analyze the patient's information and present the most relevant content [36].

To test the qualitative data of patients' perceptions, we conducted Spearman's correlation (rho) tests to analyze the relationship between the severity of depression (measured by HAM-D) [23], level of disability (measured by SDS) [25], quality of life in the social domain (measured by WHOQOL-BREF, social domain) [27], and intensity of cognitive distortions (measured by CD-Quest) [28].

Results

Of the 24 patients randomized to BAT in the RCT [5], 19 (66.6%) attended the first session and were included in this descriptive study. Of the 19 patients, the majority were female [n = 18 (94.7%)] and were therefore included for analysis in this study. We present their socio-demographic and clinical data in Table 2.

Twelve patients had at least one comorbidity (63.1%), the most frequent being anxiety disorders, mainly generalized anxiety disorder and panic disorder. All patients had MDD with moderate to severe according to the HAM-D [23] and recurrent or chronic specificity



Fig. 1 Behavioral model of major depressive disorder (MDD). Adapted from Martell et al. [19, 32]

 Table 1
 Semi-structured interview to formulate the behavioral model of depression

How was your life before the depres- sive symptoms began?
How were you before then? What did you like to do?
How did you spend your time? What was the best phase of your life?
What do you associate with the onset of these symptoms?
What triggered the symptoms?
What happened to you to start feeling this way?
What do you think may have occurred to make you feel depressed?
What exactly did you start feeling in your body as you become depressed?
What were the most frequent feelings or emotions?
What do you currently feel?
Can you better describe what you feel?
How did you act after the problems and symptoms you just told me?
What were your attitudes and actions? Did you stop doing anything?
What did you do differently?
Do you think about negative things?
Can you give me examples of such thoughts?
What is your routine nowadays?
What do you do during the day?

(dysthymia). The anxiety level of the sample was also considered severe according to the BAI, accompanied by high social impairment (SDS) [25] and low quality of life in the social domain (WHOQOL-BREF, social domain) [27].

According to the CD-Quest [28], the patients presented a severe level of cognitive distortions, among which the most common were labeling (giving broad, global, fixed labels on themselves or others), should-like thoughts (thinking about how things could have been and not how they are), catastrophizing (anticipation of adverse events), and mind reading (thoughts that the person imagines what others are thinking, without having sufficient evidence). All patients were on stable doses of antidepressants for at least 2 months. The most commonly used drugs were fluoxetine, paroxetine, escitalopram, venlafaxine, and amitriptyline.

After analysing of the transcribed reports from the sessions, wich were evaluated by four psychologists, it was possible to synthesize the reports according to the main contents. Table 3 presents the perception of female patients about SLE, emotional experience, and

Table 2 Clinical and demographic characteristics of the sample

Clinical and demographic characteristics	Sample (<i>n</i> = 18)
Sex (females): n (%)	18 (100%)
Color or race	
Black: <i>n</i> (%)	7 (38.9%)
Mixed/brown: n (%)	6 (33.3%)
White: <i>n</i> (%)	5 (27.8%)
Age: M (SD)	42.9 (9.9%)
Marital status	14 (74.7%)
Single: <i>n</i> (%)	13 (72.2%)
Married or stable union: <i>n</i> (%)	5 (27.8%)
Higher education: <i>n</i> (%)	10 (55.6%)
Employed: n (%)	11 (61.1%)
Comorbidities	
None: <i>n</i> (%)	6 (36.8%)
≥1 Comorbidity: <i>n</i> (%)	12 (63.1%)
Type of MDD	
First episode: n (%)	1 (5.2%)
Recurrent: n (%)	8 (44.4%)
Chronic (distimic): <i>n</i> (%)	9 (50.0%)
HAM-D: M (SD)	23.3 (6.0)
BAI: M (SD)	29.0 (11.7)
SDS: M (SD)	20.8 (6.3)
WHOQOL-BREF: social domain	35.8 (18.5)
CD-Quest: M (SD)	43.3 (13.2)

BAI Beck Anxiety Inventory, CD-Quest Cognitive Distortion Questionaire, HAM-D Hamilton Depression Rating Scale, M mean, SD standard deviation, SDS Sheehan Disability Scale, WHOQOL-BREF World Health Organization quality of life scale abbreviated

PBP. The records and notes obtained during the sessions where the behavioral model of depression was used (Fig. 1), along with the questions listed in Table 1 were employed to assist in the content analysis. Adaptations were made to the verbs and conjugations used in the records an notes to facilitate understanding. In cases where there were disagreements, the evaluating psychologists reached a consensus.

After transcribing the reports, we employed a meaning condensation procedure to categorize and quantify the data. The main categories of SLE, emotional experience, and PBP are presented in Table 4, along with the corresponding number of transcribed reports (n) in each category.

Some reports in Table 3 could be categorized as "isolation" or "stop doing activities," which generated disagreement among the raters. Psychological records and additional patient information helped build a consensus in this case. Often, individuals were referring to stopping engaging in social activities, so the isolation category was the most frequent. For example, some patients (patients # 4; #11; #15; #16; #17) reported,

Avoidant or passi	Feelings and emotions	N° (#) Stressful life events
	oidant or passive behavioral patterns perceived by the female patients	Table 3 Stressful events, feelings, and av

N° (#)	Stressful life events	Feelings and emotions	Avoidant or passive behavioral patterns
-	Disagreement with mother; financial difficulties; problems at work	Discouragement; lack of interest; irritation; sleepiness	Browsing the internet aimlessly; drinking; quarreling with mother; sleeping; isolating oneself
2	Distance from siblings, lack of social support during preg- nancy; father's death	Rejection; inferiority; sadness	Neglect household chores; avoiding the family; become less active; ruminating
Ś	Quarrel with mother-in-law; distance from the father; unaf- fectionate husband; not owning a house	Unhappiness; vexation; guilt; disinterest	Quarreling with mother; not playing with the daughter; not attending religious meetings; spending more time in the bed- room; procrastinating tasks
4	Robbery; disagreement with boyfriend; betrayal	Anxiety; crying; inferiority; being replaced; insomnia; disinter- est	Not looking for a job; not going out; spending more time in bed; withdrawing from socialization
2	Financial difficulty; poor housing conditions; distance from children	Crying: despair, sadness; wanting to die	Stop working; sleeping; avoid the family; being less communi- cative
9	Disagreement with mother; financial difficulties; decreased standard of living; divorce	Anguish; frustration; sadness	Staying home; avoiding friends; staying in bed; being still; procrastinating; stop reading; ruminating
7	Divorce; brother's suicide	Anguish; discouragement; anger; sadness	Getting agitated; stop eating; becoming silent; don't leaving the house; getting isolated; being less communicative
00	Disabling accident; weight gain; dropping out of college	Anguish; anxiety; discouragement; sadness	Stop going out; staying more time in bed; getting isolated; being less communicative; ruminating
6	Accident; legal/judicial problems; demanding boss; death of someone dear to them	Crying; helplessness; physical pain; irritation; upset; disinterest; sadness	Stop listening to music; stop seeing people; sleeping; being less communicative; getting isolated; complaining with friends
10	Sick mother; family problems; bad romantic relationship, end of a relationship	Crying: discouragement; disinterest; sadness	Sleeping; being still; being inactive; ruminating
11	Quarrels with husband; taking care of the baby; financial dif- ficulty; loneliness	Discouragement; anger; sadness	Quarreling with her husband; getting isolated; withdrawing
12	Sexual abuse; absence of father and mother; responsibilities at work	Disinterest; discouragement; inability; inferiority; sadness	Not leaving home; not socializing; ruminating
13	Husband's betrayal; disagreement with husband; problems at work	Downcast; hopelessness; anhedonia; lack of goals; sadness	Staying in bed more; avoiding going out from home; ruminat- ing
14	Distance from daughter	Anxiety; Depression; insomnia	Stop visiting people; quit religious work; staying home; ruminat- ing
15	Aggressive father; addicted boyfriend; lack of family and social support	Anxiety; Depression; physical pain; anhedonia; sadness	Avoiding people; psychomotor retardation; paralyze; withdraw- ing from socialization; declining invitations to go out
16	Mother's death; being demoted at work; performing tasks outside your role ob at work	Discouragement; feeling of loss	Spending more time drinking; not going to church; sleeping; declining invitations; getting isolated; withdrawing
17	Robbery; rape; miscarriage; betrayal	Anxiety; Depression; hatred; insomnia	Neglecting personal hygiene; neglecting household chores; spending more time at home; sleeping; withdrawing; ruminat- ing
18	Uncommunicative husband; daughter facing difficulties; painful knee	Anguish; irritation; disinterest; discouragement	Quarreling with husband; not going to church; staying in bed; being inactive; avoiding going out; staying in the bedroom; being concerned; ruminating

Stressful life events		Emotions and feelings		Avoidant or passive behavioral patterns	
Categories	n	Categories	n	Categories	n
Romantic relationship problems	16	Sadness or unhappiness	18	Become isolated or avoiding people	35
Family problems	10	Discouragement or disinterest	16	Stop doing activities	17
Distance from family	7	Anxiety or anguish	11	Staying in bed or being inactive	12
Financial problems	6	Irritation, anger, and vexation	8	Ruminating or being concerned	10
Problems at work	6	Inferiority	7	Sleeping	6
Grieving	5	Helplessness or hopelessness	6	Quarreling	4
Physical or verbal violence	4	Crying	4	Drinking	2
Accidents	2	Changes in sleep patterns	4	Procrastinating	2
Physical or health problems	2	Guilt	2	Other ones ^c	2
Other ones ^a	4	Other ones ^b	4	-	

Table 4 Categorization of stressful events, feelings, and avoidant and or passive behavioral patterns

^a Legal problems (n = 2), interpersonal problems (n = 1), housing problems (n = 1)

^b Pain (n = 3), being replaced (n = 1)

^c Drinking alcoholic beverages (n = 2), procrastinating (n = 2), browsing the Internet (n = 1)

I've become more withdrawn, meaning becoming less socially communicative or speaking less during social interactions. Other patients reported *I am quieter*, a phrase whose meaning also indicates becoming less communicative and tending toward isolation. The rater consensus chose *withdrawing* to represent this passive pattern. Discussions and consensus were also generated regarding the categorization of SLE, which resulted in broader categories of stressors being chosen. For example, *divorce* and *aggressive husband* were stressors encompassed under the domain of *romantic relationship problems*. Some categories probably co-occur (e.g., ruminating and staying in bed or being inactive).

We performed Spearman's correlations to assess the correlation between perceptions about emotions and passive patterns. We tested the correlation between mood symptoms, anxiety symptoms, cognitive distortions, and functional impairment. Table 5 presents the bivariate Spearman's correlations.

Emotional perceptions related to depressed mood (assessed by item 1 of the HAM-D), the category most reported by patients, vary in conjunction with anxiety symptoms according to the BAI, another category reported by patients (Spearman's r=0.632, p<0.05), suggesting a moderate correlation. Similarly, the depressed mood was also moderately correlated with functional disability (Spearman's r=0.608, p<0.05), according to the SDS. Similarly, anxiety symptoms (BAI) were positively correlated with disability (SDS) (Spearman's r=0.476, p<0.05). We also found a moderate correlation between depressed mood (HAM-Ditem1) and "what if" type thoughts (CD-QUESTitem14) (Spearman's r=0.603, p<0.05).

Tab	ole 5 Spe	earman's biva	ariate correlat	ions (r)	among the	scales
of	anxiety	symptoms,	depression,	social	impairment,	and
cog	nitive dis	stortions				

Measures	Depressive mood (HAM-Ditem1)	Anxiety (BAI)
BAI (anxiety)	0.632*	-
SDS (disability)	0.608*	0.476*
HAM-Ditem7: work and activities	-0.014	-0.133
WHOQOL-BREF social domain	-0.029	-0.180
CD-QUEST	0.359	0.16
CD-QUESTitem2: catastrophization	0.462	0.234
CD-QUESTitem5: rotulation	0.290	0.208
CD-QUESTitem8: mental reading	0.246	-0.082
CD-QUESTitem11: would be	0.105	- 0.056
CD-QUESTitem14: what if	0.603*	0.284

BAI Beck Anxiety Inventory, CD-QUEST Cognitive Distortions Questionaire, HAM-D Hamilton Depression Rating Scale for Depression, SDS Sheehan Disability Scale, WHOQOL-BREF World Health Organization quality of life scale abbreviated * p < 0.05

Discussion

This study explored women's perceptions of SLE triggers of depressive episodes, emotional experiences, and passive or avoidant behavioral patterns in the context of MDD. The most commonly reported SLE were categorized into themes such as Romantic relationship problems, Family problems, and Distance from family. Emotional experiences associated with these SLE included Sadness and unhappiness, Discouragement or disinterest, and Anxiety or anguist. The most frequently reported PBP were become isolated or avoiding people, stop doing activities, staying in bed or remaining inactive, and ruminating. This is one of the few studies correlating SLE and passive patterns in female patients undergoing BAT.

Our updated and adapted behavioral model of MDD (Fig. 1), based on the original model by Martell et al. [19, 32] includes etiological variables [37] and integrates with the DSM-5 symptoms of MDD [1]. By providing visual representation, the model helped investigate patients' life history and triggers of depressive episodes, facilitating the establishment of functional relationships between contexts, emotions, and behaviors [38, 39]. This integration facilitates its use by other mental health professionals and patients alike. One patient in our sample reported only one SLE perceived as a trigger (patient #14, distance from her daughter). Similarly, patient #10 reported only a small number of passive patterns. The data collected in this study confirm that patients tend to perceive their depressive episodes as being triggered by various SLE. Studies indicate that different perceptions of triggers are related to seeking appropriate treatment [40, 41].

Some studies suggest that between 88 and 95% of patients perceive biological factors and stressful situations as triggers for Depression [40, 42], which is consistent with the findings of this study. Our study provides a thorough exploration of the relationship between SLE and depression. The behavioral model of depression (Fig. 1) can enhance patients' sense of control and hope by helping them perceive themselves within a specific context, which promotes acceptance and understanding of their emotional and behavioral responses to circumstances. This, in turn, allows them to make sense of their experiences and actions [33, 43, 44].

Several hypotheses have been proposed to explain how SLE can lead to depressive mood, anhedonia, and PBP [45]. First, passive behavior in response to stressors may have evolutionary survival value. Second, behavioral responses, such as crying and facial expressions, to stressors can evoke care and help from others [46, 47]. Additionally, passive patterns may function adaptively by conserving energy in chronically stressful and unrewarding environments, but can also contributes to pathological depression, which results in disability and suffering [45, 48].

The SLE reported by patients refer to chronic, inescapable, and uncontrollable stressors such as distance from family, marital conflicts, accidents, or death of a loved one. These stressors can also represent role transitions and life changes that particularly affect women [49]. Importantly, patients tend to perceive a series of SLE instead of just one, wich is consistent with the chronic mild stress model of depression [50]. In a study by Duran et al., (2020) [51], 58.5% of patients with MDD and comorbid post-traumatic stress disorder reported experiencing multiple traumatic events. Our data indicate that all female patients perceived one or more stressors as triggers for MDD. This supports the hypothesis that women may be more sensitive to SLE than men; however, there is insufficient evidence regarding the type of SLE (interpersonal versus non-interpersonal) in the different sexes/ genders [7, 52].

The relationship between stressors and depression has abundant evidence in both humans [53–56] and animal models of depression, which induce passive patterns in humans or depressive-like behaviors in other animals [14]. Chronic stress can induce bio-behavioral states that result in more effort to obtain pleasurable social stimuli [57, 58]. However, research on SLE encounters difficulties in categorizing the types of stressors [40], and comparing stressors in animal models with stressors in humans is chalenging [47]. Hormonal changes from the menstrual cycle, pregnancy, and lactation appear to mediate the effect of stress in women [7, 59, 60], especially in the face of interpersonal stressors [61].

The majority of reports on SLE in female patients were categorized as Romantic relationship problems or other interpersonal problems, highlighting the significance of affective bonds and attachment figures [62, 63]. SLE related to attachment, affection, and relatedness can be interpreted as a life change that reduces social support, which has evolutionary survival value for humans and other mammals [64]. Therefore, disruption in a relationship can induce a depressed mood through sudden losses of attachment figures and loss of positive affect [65]. The main SLE categories we found align with data showing that MDD is more common among unmarried people, those who lack social support, or live alone [66, 67]. Interpersonal conflicts are marked by offense, disruption, and frustration of the personal expectations regarding the other [62], producing negative evaluations about themselves, which is compatible with the reports of anger, inferiority, and shame, and with the high CD-Quest scores [28]. The reports also seem to reflect the low quality of life in the sample's social domain, as assessed by the WHOQOL-BREF [27].

Regarding the categories or perceived emotions, the majory of reports were related to feelings of *Sadness or unhappines* and *Discouragement or disinterest*, which are compatible with the diagnostic criteria of depressed mood and anhedonia, respectively [1]. Anhedonia is defined as a reduction or lack of interest and/or inability to feel pleasure [68, 69] and can be characterized by the absence of feelings related to pleasure [70]. It also involves reduced motivation (anticipatory anhedonia) and a decrease expectancy of pleasure [57, 58]. In contrast to consummatory anhedonia, which is a negative symptom of psychotic disorders, patients with MDD seem to experience anticipatory anhedonia, which

may explain the re-engagement in rewarding activities after BAT [31].

Regarding PBP, the most frequent category of reports was Become isolated or avoiding people (withdrawing), which is supported by quantitative data assessed by item 7 of the HAM-D [23] and by the SDS [25]. The SDS includes social impairment, indicating that social isolation is a hallmark of MDD [71, 72]. During a depressive episode, patients exhibit deficits in several pro-social behaviors, such as avoiding eye contact, smiling less frequently, increased verbal latency, diminished empathy, and increased aggressive behaviors [73]. Chronic stressors reduce motivation for social contact (social anhedonia) [57]. Thus, patients may be more sensitive to criticism, rejection, and exclusion, making socializing more challenging. Socializing becomes even more costly for depressed individuals following interpersonal frustrations [65]. Our data suggest that patients avoiding social contact also seem to ruminate negative thoughts about themselves, especially if the symptoms are triggered by interpersonal conflicts [74-76].

Stop doing activities was the second most frequently reported category of PBP, in line with high SDS scores. Most patients reported a decrease in previously enjoyable and obligatory activities such as work, household chores, leisure, and social interactions. MDD is a highly impactful condition with one of the highest disease burdens. This behavior pattern may result from anhedonia, mainly due to exposure to chronic stress [50, 77], and increases the perceived burden of illness [6].

Staying in bed or being inactive frequently occurred in our sample, as expected in MDD [78, 79]. Reports under this category may result from reduced psychomotor activity or anhedonia, the function of which is to conserve metabolic resources. This pattern is possibly caused by stressors related to failure or defeat [46] and may be preceded by fatigue and rumination. Alternatively, it may manifest as psychomotor retardation and anhedonia [80, 81]. Inactivity patterns have been induced in animal models of depression following chronic mild stress or learned helplessness. They become evident when animals remain inactive to avoid shock and become immobilized in the forced swim test and the tail suspension test [14, 16, 82].

Rumination was also frequently reported in our sample, as were worries. Rumination involves repeatedly thinking about or focusing on negative thoughts about losses, failures, and defeats and is associated with a depressed mood [83]. Worries refer to repetitive thoughts with content related to problem-solving attempts that elicits fear and anxiety [84]. Accordingly, the CD-Quest [28] showed

high scores. The category of *what-if* thoughts, which is compatible with worries and ruminations, was statistically correlated with depressed mood. Ruminations and worries are features of MDD with comorbid anxiety disorders [85, 86]. In our sample, 63.1% had at least one comorbid anxiety disorder, which is a known finding in the literature [87, 88], and illustrated by the reports categorized as *anxiety* and *anguist*.

Ruminations and worries are considered avoidance patterns because their adaptive function is to anticipate and reflect on potential mistakes and problems, and avoid them beforehand [89–91]. From a functional point of view, worries persist, even ineffectively, because staying preoccupied is a way of experiential avoidance of feelings related to "lack of control" [92]. Similarly, some authors [83, 90, 91, 93] indicate that ruminations are also avoidant patterns. Our data suggest that passive patterns can co-occur, such as ruminating about personal losses and failures and lying in the bed. At the same time, someone lying in bed may avoid contexts that produce helplessness, loneliness, and emptiness [84]. Ruminations may co-occur with other passive patterns and facilitate them [94].

Limitations

This study has several significant limitations. Firstly, the categorization of reports relied on patient's perceptions, potentially leading to missed symptoms and PBP that were not reported. Additionally, certain PBP could have been misclassified into other categories. Future studies could address these limitations by utilizing other validated instruments and improving the descriptions of PBP.

Another limitation is that the data collected from this mixed methods study cannot be generalized to the entire population, as the sample was composed solely of female patients. Therefore, it was impossible to identify any differences in the reports between male and female patients. Moreover, the study did not distinguish between sex and gender, which could have influenced the reports. The small sample size and the instruments used also limited the ability to conduct more robust statistical analyses, such as logistic regression, to predict the occurrence of PBP from stressors and emotional symptoms. Despite these limitations, the data remains useful in psychotherapy, as it provides a qualitative and quantitative description of the personal experience of SLE and PBP in women.

It is important to note that this is one of the few that has analyzed this subject, enabling future research on the topic, especially if differences between genders are investigated.

Conclusion

The data collected from this study highlight the interaction between SLE and PBP in women with MDD. The reports indicate that SLE related to interpersonal problems in the family and affective relationships are frequently reported by women. Additionally, the reports demonstrate the occurrence of avoidant or passive behavioral patterns, which hinder contact with environmental rewards, and this is consistent with the behavioral model of depression. Our study can be valuable in the context of various treatment modalities, such as Behavioral Activation Therapy, Trial-Based Cognitive Therapy and Interpersonal Therapy.

Based on our findings, it is essential to actively investigate SLE and passive patterns during psychological and psychiatric treatments. The reports complement the understanding of MDD triggers in women and their behavioral effects, and our data support evolutionary and psychological explanations of the nature of depressive episodes. Further research will provide a comprehensive understanding of psycho-biological reactions to stress in different populations, leading to the development of prevention and treatment strategies for depressive disorders.

Abbreviations

BAT	Behavioral activation therapy
CBT	Cognitive-behavioral therapy
IPT	Interpersonal psychotherapy
MDD	Major depressive disorder
PBP	Passive behavioral patterns
TBCT	Trial-based cognitive therapy

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Authors' contributions

CH conceived the aim of the study, analyzed and interpreted data on stressful life events and passive behavioral patterns. IM, MAPM, and AMF categorized patient reports. MD contributed to the descriptions of methods and analysis of the reports. IRO was the study coordinator, contributing to the analysis and writing. The author(s) read and approved the final manuscript.

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Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

This research was approved by the Ethics Research Committee of the Instituto de Ciências da Saúde at the Universidade Federal da Bahia (CAAE: 44663315.4.0000.5662).

All participants in this study were presented with a Free and Informed Consent Form, authorizing the collection of data and consenting to publication. The data was treated with confidentiality and anonymity.

Competing interests

The authors declare that they have no competing interests.

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