Original Article

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Psychiatry/Mental Health Section

Emotional Regulation and Serum Cortisol Levels in Patients with Depressive Disorders versus General Population: A Cross-sectional Study

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ABSTRACT

Introduction: Depressive disorders are among the most prevalent and disabling mental health conditions and are increasingly conceptualised as illnesses involving maladaptive emotional regulation. In parallel, neuroendocrine mechanisms—particularly Hypothalamic–Pituitary–Adrenal (HPA) axis dysregulation—have been implicated, with elevated morning cortisol reflecting sustained stress-system activation in depression.

Aim: To determine the levels of emotional regulation and serum cortisol in patients with depressive disorders, in comparison with the general population.

Materials and Methods: This single-centre, cross-sectional study was conducted in the outpatient Department of Psychiatry, Chettinad Hospital and Research Institute, Kelambakkam, Tamil Nadu, India, over eight months (November 2024-June 2025). A total of 74 participants were recruited using purposive sampling: 37 patients with depressive disorders and 37 individuals from the general population. Depression severity was assessed using the Hamilton Depression Rating Scale (HAM-D-17), emotion-regulation difficulties were evaluated using the Difficulties in Emotion Regulation Scale (DERS total and subscales), and morning serum cortisol (8:00–9:00 AM) was measured via chemiluminescent immunoassay. Data were analysed using IBM Statistical Package for the Social Sciences (SPSS) Statistics version 26.0. Independent-samples t-test, Chi-square/Fisher's exact test, and Pearson correlation were applied, with two-tailed p-value<0.05 considered as statistically significant.

Results: Both the groups were demographically comparable, with no significant differences in age, gender, marital status, education, residence, or socio-economic background. In the depressive disorder group, the mean±SD age at illness onset was 33.2±7.5 years, with an average illness duration of 21.5±18.5 months. Most patients had mild to moderate depression, and the majority were experiencing their first episode. A statistically significant difference was observed in previous psychiatric hospitalisation, reported in 6 (16.2%) of patients but none in the control group (p-value=0.011). Patients with depressive disorders had significantly higher DERS scores compared with the general population, indicating greater difficulties in emotional regulation. Subscale scores for non acceptance, goals, strategies, and clarity were significantly higher in patients, while impulse and awareness domains showed no significant differences. Serum cortisol levels were markedly elevated in the depressive group and strongly correlated with HAM-D scores (r-value=0.826) and DERS total scores (r-value=0.711).

Conclusion: Patients with depressive disorders exhibited significantly higher emotional dysregulation and serum cortisol levels compared to the general population.

Keywords: Depression, Difficulties in emotional regulation, Emotion dysregulation, Hamilton depression rating scale

INTRODUCTION

Depressive disorders are among the most prevalent and disabling mental health conditions globally, affecting over 280 million individuals across all age groups [1]. Characterised by persistent low mood, anhedonia, cognitive impairment, and functional decline, depression significantly contributes to reduced quality of life, increased risk of suicide, and substantial socio-economic burden [2]. While the aetiology of depression is multifactorial—encompassing genetic, neurobiological, and psychosocial components—emerging evidence highlights the critical role of emotional dysregulation in its onset, maintenance, and prognosis [3].

Emotion regulation refers to the processes by which individuals influence the experience and expression of their emotions to meet situational demands and achieve personal goals [4]. Difficulties in emotion regulation have been increasingly implicated in various forms of psychopathology, particularly mood and anxiety disorders. In patients with depression, such difficulties manifest as impaired ability to manage negative affect, difficulty accessing adaptive coping strategies, and poor emotional clarity and acceptance [5,6]. These impairments are not merely consequences of depressive symptoms but are believed to play a causal role in the development and persistence of the disorder. The DERS scale is a widely used and validated tool for assessing multiple dimensions of emotion dysregulation, including non acceptance, goal-directed behaviour, impulse control, awareness, access to regulation strategies, and emotional clarity [7].

In addition to psychological mechanisms, neurobiological systems—particularly the HPA axis—have been implicated in the pathophysiology of depression. The HPA axis regulates the body's stress response by modulating the secretion of cortisol, a glucocorticoid hormone. Hyperactivity of the HPA axis and elevated cortisol levels have been consistently observed in individuals with major depressive disorder, especially those with severe or recurrent episodes [8]. Dysregulated cortisol secretion contributes to alterations in brain structure and function, notably in regions such as the hippocampus and prefrontal cortex, which are essential for mood regulation and cognitive control [9]. While hypercortisolemia has been associated with depressive symptom severity [10], its

relationship with emotional regulation difficulties in depression remains relatively unexplored.

Understanding the interrelationship between emotional dysregulation and neuroendocrine dysfunction could provide deeper insights into the mechanisms underlying depression and aid in the development of more targeted interventions. To date, concurrent assessment of emotional regulation difficulties and serum cortisol levels in individuals with depressive disorders—particularly in comparison with healthy controls—remains scarce. Against this background, the objectives of the present study were to determine the levels of emotional regulation and serum cortisol in patients with depressive disorders in comparison with the general population, and to assess factors associated with difficulties in emotional regulation among patients with depressive disorders.

MATERIALS AND METHODS

This was a single-centre, cross-sectional study conducted in the Outpatient Department of Psychiatry, Chettinad Hospital and Research Institute, Tamil Nadu, India, over a period of eight months, from November 2024 to June 2025. The study received approval from the Institutional Human Ethics Committee (IHEC; reference number IHEC-I/3216/24 dated 11/11/2024).

Inclusion criteria: The study included two groups of participants: patients with depressive disorders and individuals from the general population.

For the depressive disorder group, inclusion criteria were: individuals aged 18-59 years, meeting the diagnostic criteria for depressive disorders as per ICD-11 (6A70-6A7Z), and who were either currently symptomatic or in remission [11].

For the general population group, inclusion criteria were: individuals aged 18-59 years, with no history of psychiatric illness, selected from the field practice area of the tertiary care hospital, Chennai, Tamil Nadu, India.

Exclusion criteria: Participants having coexisting psychiatric disorders, were uncooperative due to severity of illness, or had co-morbid chronic medical illnesses were excluded form the study.

Each participant, along with their attendant when applicable, was provided with a Participant Information Sheet (PIS) translated into their local language. The information was also explained verbally to ensure clear understanding and voluntary agreement. Written informed consent was obtained prior to enrollment.

Sample size: Based on a correlation coefficient of 0.16 between cortisol concentrations and depression scores [12], with a 95% confidence level and 90% power, the minimum required sample size was 28 per group using Fisher's arctanh transformation. To improve precision, the sample size was increased to 37 per group, yielding a final total of 74 participants. Participants were enrolled using non probability purposive/convenience sampling.

Study Procedure

Socio-demographic and clinical data were recorded using a structured proforma. The severity of depressive symptoms was assessed using the HAM-D, a clinician-administered tool evaluating domains such as mood, insomnia, guilt, and somatic symptoms. HAM-D items were rated on either a 3-point or 5-point Likert scale, yielding a total score ranging from 0 to 52. Interpretation was as follows: 0-7, normal; 8-13, mild depression; 14-18, moderate depression; 19-22, severe depression; ≥23, very severe depression [13].

Difficulties in emotional regulation were assessed using the DERS, a self-reported questionnaire evaluating six domains: non acceptance, goals, impulse, awareness, strategies, and clarity. Each item was rated on a 5-point Likert scale, and the total score ranged from 36 to 180, with higher scores indicating greater emotional dysregulation. Following Guzmán-González M et al., a total DERS score of 73 was used as the cut-off to distinguish individuals with and without emotional regulation difficulties [14]. The scale has been validated for use in India [15,16].

For serum cortisol estimation, a 5 mL venous blood sample was collected from each participant under aseptic precautions between 8:00 and 9:00 AM to account for diurnal variation. Blood samples were transferred into serum separator tubes and allowed to clot at room temperature, followed by centrifugation at 3000 rpm for 10 minutes. The separated serum was analysed for cortisol concentration using a chemiluminescent immunoassay in the hospital's central biochemistry laboratory.

STATISTICAL ANALYSIS

Data entry and analysis were performed using SPSS version 26.0 (IBM Corp., Armonk, NY, USA) [17]. Normality of continuous variables was assessed using the Shapiro-Wilk test and visual inspection of Q-Q plots; distributions were found to be normal, and parametric tests were applied. Descriptive statistics summarised socio-demographic and clinical characteristics. Continuous variables were expressed as mean±Standard Deviation (SD), while categorical variables were presented as frequencies and percentages. Group comparisons between patients with depressive disorders and the general population were conducted using the Independent samples t-test for continuous variables and the Chi-square test or Fisher's exact test for categorical variables, as appropriate. Pearson's correlation coefficient (r) was calculated to assess the relationship between serum cortisol levels, HAM-D scores, and DERS total and subscale scores. A p-value<0.05 was considered as statistically significant, and all statistical tests were two-tailed.

RESULTS

The mean age was 35.0±8.0 years among patients and 33.7±8.1 years among controls (p-value=0.490), with no significant differences in age distribution, gender, religion, education, occupation, or residence. The majority were married and from the lower-middle socio-economic class, with no significant differences in marital status (p-value=0.479), family type (p-value=0.327), or socioeconomic status (p-value=0.588), suggesting adequate group matching [Table/Fig-1].

Parameters		Depressive disorder patients (N=37) n (%)	General population (N=37) n (%)	p-value
Age (in years), Mean±SD		35.0±8.0	33.7±8.1	0.490
Age (in years)	≤30	13 (35.1)	13 (35.1)	0.622
	31 to 40	14 (37.8)	17 (45.9)	
	41 to 50	9 (24.3)	5 (13.5)	
	51 to 60	1 (2.7)	2 (5.4)	
Gender	Female	19 (51.4)	16 (43.2)	0.485
	Male	18 (48.6)	21 (56.8)	
Religion	Christian	2 (5.4)	2 (5.4)	1.000
	Hindu	32 (86.5)	32 (86.5)	
	Muslim	3 (8.1)	3 (8.1)	
Education	Primary school	2 (5.4)	3 (8.1)	0.736
	Middle school	11 (19.7)	7 (18.9)	
	High school	10 (27.0)	11 (29.7)	
	Graduate	14 (37.8)	16 (43.2)	
Occupation	Semiskilled	17 (45.9)	16 (43.2)	0.967
	Skilled	7 (18.9)	7 (18.9)	
	Unskilled	13 (35.1)	14 (37.8)	
Residence	Rural	24 (64.9)	24 (64.9)	1.000
	Semi urban	9 (24.3)	9 (24.3)	
	Urban	4 (10.8)	4 (10.8)	

Marital status	Married	24 (64.9)	26 (70.3)	0.479
	Separated	0	1 (2.7)	
	Unmarried	13 (35.1)	10 (27.0)	
Type of family	Joint	4 (10.8)	7 (18.9)	0.327
	Nuclear	33 (89.2)	30 (81.1)	
Socio-economic status	Lower middle	29 (78.4)	27 (73.0)	0.588
	Upper middle	8 (21.6)	10 (27.0)	

[Table/Fig-1]: Socio-demographic characteristics of depressive disorder patients and general population.
*Statistically significant at p<0.05; SD: Standard deviation

Among patients with depressive disorders, the mean age at onset was 33.2±7.5 years. The mean illness duration was 21.5±18.5 months, and the current episode duration averaged 8.0±6.4 months. Most patients had mild depression (n=24, 64.9%), followed by moderate (n=12, 32.4%) and severe (n=1, 2.7%). Previous psychiatric hospitalisation was reported in 6 patients (16.2%), which was significantly higher than in controls (p-value=0.011). Medical co-morbidities were present in 5 participants (13.5%) in both groups, and no participant reported a family history of psychiatric illness [Table/Fig-2].

Variables		Depressive disorder patients (N=37) n (%)	General population (N=37) n (%)	p-value
Age at illness onset (in years), Mean±SD		33.2±7.5	_	_
Duration of illness (in months), Mean±SD		21.5±18.5	_	_
Duration of current episode (in months), Mean±SD		8.0±6.4	_	_
Severity of current episode	Mild	24 (64.9)	_	_
	Moderate	12 (32.4)	_	
	Severe	1 (2.7)	_	
Course of illness	Continuous	23 (62.2)	_	_
	Episodic	14 (37.8)	_	
Number of illness episodes	0	23 (62.2)	_	_
	1	9 (24.3)	_	
	>2	5 (13.5)	_	
Previous hospitalisation	No	31 (83.8)	37 (100)	0.011*
	Yes	6 (16.2)	0	
Comorbidity	No	32 (86.5)	32 (86.5)	1.000
	Yes	5 (13.5)	5 (13.5)	
Family history	Present	0	0	_
	Absent	37 (100)	37 (100)	

[Table/Fig-2]: Clinical characteristics of depressive disorder patients and general population.
*Statistically significant at p<0.05

Clinical measures demonstrated clear group differences. Depression severity, as measured by HAM-D, was markedly higher in patients (13.4±4.2). Emotion regulation difficulties were also greater, with a significantly higher mean DERS total score in patients (70.1±8.6) compared with controls (52.3±5.3) (p-value<0.001). Subscale analysis revealed significantly higher scores for nonacceptance, goals, strategies, and clarity in the depressive group (all p-value<0.001), whereas impulse (p-value=0.951) and awareness (p-value=0.069) did not differ significantly [Table/Fig-3]. Morning serum cortisol levels were substantially elevated in patients (45.0±14.2 µg/dL) compared with controls (15.5±6.5 µg/dL) (p-value<0.001).

Correlation analysis among depressive disorder patients indicated that cortisol levels were strongly associated with depression severity (HAM-D: r=0.826, p-value<0.001) and moderately associated with overall emotion dysregulation (DERS total: r=0.711, p-value<0.001).

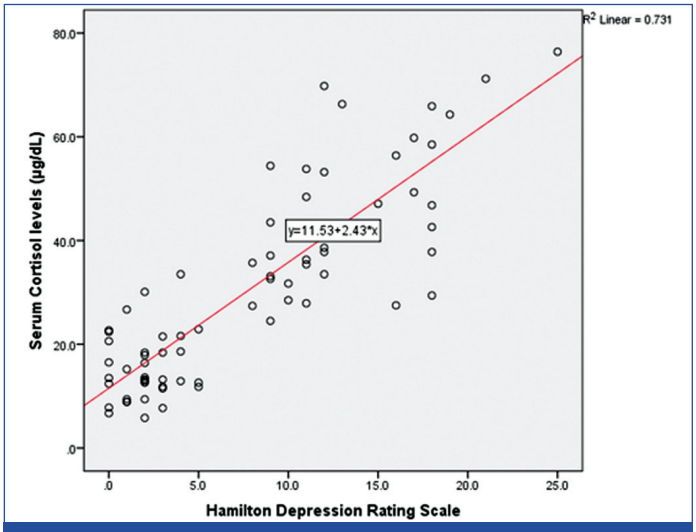
Significant positive correlations were also observed with the DERS subscales of non acceptance (r-value=0.438), goals (r-value=0.329), strategies (r-value=0.537), and clarity (r-value=0.501) (all p-value<0.05), but not with impulse or awareness [Table/Fig-4-6].

Variables		Depressive disorder patients (N=37) n (%)	General population (N=37) n (%)	p-value
HAM-D scores, Mean±SD		13.4±4.2	2.1±1.5	<0.001*
Severity of depression	Absent	0	37 (100)	<0.001*
	Mild	24 (64.9)	0	
	Moderate	12 (32.4)	0	
	Severe	1 (2.7)	0	
DERS scores, Mean±SD		70.1±8.6	52.3±5.3	<0.001*
DERS - Non acceptance, Mean±SD		12.5±4.9	8.6±1.8	<0.001*
DERS - Goals, Mean±SD		11.5±4.4	7.9±2.4	<0.001*
DERS - Impulse, Mean±SD		8.8±1.8	8.8±1.9	0.951
DERS - Awareness, Mean±SD		9.2±2.3	8.3±1.5	0.069
DERS - Strategies, Mean±SD		17.0±5.0	10.6±2.3	<0.001*
DERS - Clarity, Mean±SD		11.2±2.9	8.1±2.0	<0.001*
Serum Cortisol levels (µg/dL), Mean±SD		45.0±14.2	15.5±6.5	<0.001*

[Table/Fig-3]: Comparison of HAM-D scores, emotional regulation and serum cortisol levels between depressive disorder patients and general population.
DERS: Difficulties in emotion regulation scale; SD: Standard deviation; HAM-D, Hamilton depression rating scale; *Statistically significant at p<0.05

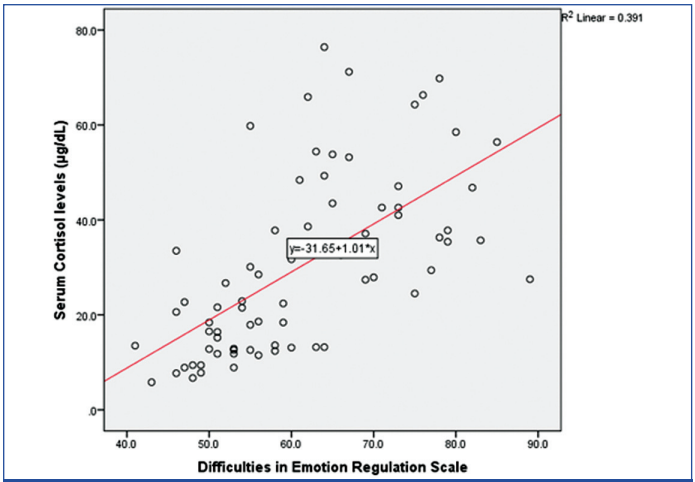
Serum Cortisol levels (µg/dL)	Correlation coefficient (r)	p-value
HAM-D scores	0.826	<0.001*
DERS scores	0.711	<0.001*
DERS - Non acceptance	0.438	<0.001*
DERS - Goals	0.329	0.004*
DERS - Impulse	0.104	0.376
DERS - Awareness	0.105	0.373
DERS - Strategies	0.537	<0.001*
DERS - Clarity	0.501	<0.001*

[Table/Fig-4]: Correlation between HAM-D scores, emotional regulation scores and serum cortisol levels.
*Statistically significant at p<0.05



[Table/Fig-5]: Correlation between HAM-D scores and serum cortisol levels.

Within the depressive disorder group, patients classified as having emotion regulation difficulties (n=16) versus those not classified as such (n=21) showed no significant differences in socio-demographic profile, clinical characteristics, HAM-D scores (13.7±3.5 vs 13.1±4.8; p-value=0.702), or serum cortisol levels (44.9±14.3 vs 45.1±14.5



[Table/Fig-6]: Correlation between DERS scores and serum cortisol levels.

µg/dL; p-value=0.980), suggesting that cortisol elevations reflected depression severity and overall dysregulation rather than this categorical DERS-based grouping [Table/Fig-7-9].

Variables		Difficulties in emotional regulation		p-value
		Present (N=16)	Absent (N=21)	
		n (%)	n (%)	
Age (in years), Mean±SD		34.3±7.9	35.6±8.3	0.643
Age (in years)	≤30	6 (37.5)	7 (33.3)	0.846
	31 to 40	6 (37.5)	8 (38.1)	
	41 to 50	4 (25.0)	5 (23.8)	
	51 to 60	0	1 (4.8)	
Gender	Female	6 (37.5)	13 (61.9)	0.141
	Male	10 (62.5)	8 (38.1)	
Religion	Christian	1 (6.3)	1 (4.8)	0.923
	Hindu	14 (87.5)	18 (85.7)	
	Muslim	1 (6.3)	2 (9.5)	
Education	Primary school	0	2 (9.5)	0.390
	Middle school	5 (31.3)	6 (28.6)	
	High school	6 (37.5)	4 (19.0)	
	Graduate	5 (31.3)	9 (42.9)	
Occupation	Semiskilled	9 (56.3)	8 (38.1)	0.478
	Skilled	3 (18.8)	4 (19.0)	
	Unskilled	4 (25.0)	9 (42.9)	
Residence	Rural	12 (75.0)	12 (57.1)	0.509
	Semi urban	3 (18.8)	6 (28.6)	
	Urban	1 (6.3)	3 (14.3)	
Marital status	Married	10 (62.5)	14 (66.7)	0.793
	Separated	0	0	
	Unmarried	6 (37.5)	7 (33.3)	
Type of family	Joint	2 (12.5)	2 (9.5)	0.773
	Nuclear	14 (87.5)	19 (90.5)	
Socio-economic status	Lower middle	13 (81.3)	16 (76.2)	0.711
	Upper middle	3 (18.8)	5 (23.8)	

[Table/Fig-7]: Association between difficulties in emotional regulation and socio-demographic characteristics among depressive disorder patients.
*Statistically significant at p<0.05; SD: Standard deviation

Variables	Difficulties in emotional regulation		p-value
	Present (N=16)	Absent (N=21)	
	n (%)	n (%)	
Age at illness onset (in years), Mean±SD	32.5±7.2	33.8±7.8	0.619
Duration of illness (in months), Mean±SD	21.5±20.3	21.5±17.6	0.997
Duration of current episode (in months), Mean±SD	8.9±7.4	7.3±5.6	0.455
Severity of current episode	Mild	10 (62.5)	14 (66.7)	0.604
	Moderate	6 (37.5)	6 (28.6)	
	Severe	0	1 (4.8)	
Course of illness	Continuous	10 (62.5)	13 (61.9)	0.970
	Episodic	6 (37.5)	8 (38.1)	
Number of illness episodes	0	10 (62.5)	13 (61.9)	0.986
	1	4 (25.0)	5 (23.8)	
	>2	2 (12.5)	3 (14.3)	
Previous hospitalisation	No	14 (87.5)	17 (81.0)	0.592
	Yes	2 (12.5)	4 (19.0)	
Co-morbidity	No	15 (93.8)	17 (81.0)	0.259
	Yes	1 (6.3)	4 (19.0)	
Family history	Present	0	0	–
	Absent	16 (100)	21 (100)	

[Table/Fig-8]: Association between difficulties in emotional regulation and clinical characteristics among depressive disorder patients.
*Statistically significant at p<0.05

Variables	Difficulties in emotional regulation		p-value
	Present (N=16)	Absent (N=21)	
	n (%)	n (%)	
HAM-D scores, Mean±SD	13.7±3.5	13.1±4.8	0.702
Serum Cortisol levels (µg/dL), Mean±SD	44.9±14.3	45.1±14.5	0.980

[Table/Fig-9]: Association between difficulties in emotional regulation, HAM-D scores, and serum cortisol levels among depressive disorder patients.
SD: Standard deviation; HAM-D: Hamilton depression rating scale;
*Statistically significant at p<0.05

DISCUSSION

The present study aimed to examine emotional regulation and serum cortisol levels in individuals with depressive disorders compared with a general population cohort. The demographic comparability of the two groups provides a solid foundation for evaluating the association of depressive symptomatology with emotional dysregulation and neuroendocrine alterations. The mean age in the depressive disorder group was 35.0±8.0 years, closely matched with the general population group (33.7±8.1 years), indicating that age-related hormonal or psychological differences were unlikely to bias the findings. Moreover, the uniform distribution of participants across variables such as religion, occupation, family type, and socio-economic status further supports the internal validity of the comparisons. Consistent with Leach and Butterworth, the onset of depression in the present sample occurred primarily in early adulthood, with a mean onset age of 33.2 years [18]. This aligns with global epidemiological trends indicating that depressive disorders commonly emerge in the third and fourth decades of life [19].

The average duration of illness (21.5 months) and the duration of the current depressive episode (8.0 months) underscore the chronicity and persistence of depressive symptoms when not promptly addressed. Nearly two-thirds (62.2%) of patients were experiencing their first episode; nevertheless, a significant portion had recurrent or ongoing symptoms, reflecting the episodic nature of major depressive disorder, as described in the DSM-5 and ICD-11 frameworks [20,21].

In this study, the majority of individuals with depressive disorders had mild (64.9%) to moderate (32.4%) severity according to HAM-D scores, with only one individual classified as having severe depression. The mean HAM-D score in the depressive disorder group (13.4±4.2) contrasted sharply with that of the general population (2.1±1.5), and this difference was highly statistically significant.

One of the key findings of the study was the significantly elevated DERS scores among patients with depression (70.1±8.6) compared

to the general population (52.3±5.3). Berking M and Wupperman P noted that emotional dysregulation is increasingly recognised as a central feature of depressive disorders and is associated with both the onset and maintenance of symptoms [5].

Among the DERS subdomains, patients scored significantly higher in non acceptance, goals, strategies, and clarity, suggesting that individuals with depression not only struggle to manage emotions but also lack clarity in understanding their emotional experiences and face difficulty accessing adaptive regulation strategies. These findings align with the emotion dysregulation model documented by Gratz KL and Roemer L which posits that deficits in the modulation of negative affect lead to maladaptive behaviours and cognitive patterns characteristic of mood disorders [7].

Notably, the subdomains of impulse control and emotional awareness did not differ significantly between groups, implying that not all aspects of emotional regulation are uniformly impaired in depressive disorders. This selective impairment is supported by Joormann J and Stanton CH who suggested that individuals with depression may retain basic awareness of emotional states but are unable to effectively cope with them due to low self-efficacy and impaired cognitive control [3].

Patients with depressive disorders also had significantly elevated cortisol concentrations (45.0±14.2 µg/dL) compared to the general population (15.5±6.5 µg/dL). Cortisol, a glucocorticoid hormone secreted by the adrenal cortex in response to stress via the HPA axis, is a well-established biomarker of stress and has been implicated in the pathophysiology of depression [8]. Hypercortisolemia in depression reflects prolonged HPA axis activation, contributing to hippocampal atrophy, impaired neurogenesis, and emotional disturbances [22]. These neuroendocrine changes correlate with both symptom severity and functional impairment, as demonstrated in present study findings.

Further, serum cortisol levels were strongly and positively correlated with HAM-D scores (r-value=0.826), indicating that higher cortisol levels paralleled greater severity of depressive symptoms. This was consistent with studies by Vreeburg et al., and Stetler C and Miller GE (2011), which reported elevated basal cortisol levels and hyperresponsivity of the HPA axis in patients with major depression [23,24]. Additionally, cortisol levels were moderately correlated with total DERS scores (r-value=0.711), reinforcing the biological basis of emotion dysregulation in depression.

Among DERS subdomains, serum cortisol showed statistically significant correlations with non acceptance (r-value=0.438), goals (r-value=0.329), strategies (r-value=0.537), and clarity (r-value=0.501), but not with impulse (r-value=0.104) or awareness (r-value=0.105). These findings suggest that neuroendocrine dysregulation in depression may particularly affect higher-order emotional processing functions—such as the ability to accept emotions, set adaptive goals, access coping strategies, and maintain emotional clarity—while having limited influence on more basic capacities like emotional awareness or impulsivity. This aligns with Dedovic et al., who reported that elevated cortisol impairs prefrontal cortex functioning, thereby weakening executive emotional control [9].

This study also sought to assess differences in socio-demographic, clinical, psychological, and biological profiles among patients with depressive disorders, stratified by the presence or absence of emotional regulation difficulties. The socio-demographic characteristics of patients with and without emotional regulation difficulties were comparable. The mean ages of the two groups were similar (34.3 vs. 35.6 years), consistent with existing data indicating that depression with emotion regulation impairment spans early and middle adulthood [19]. Gender distribution was not significantly different; however, it is worth noting that a higher proportion of males (62.5%) exhibited emotion regulation difficulties [25]. Educational background, religious affiliation, and family structure were also consistent between groups, suggesting that sociocultural factors were unlikely to have influenced differences in emotional regulation in this cohort. Clinically, both groups demonstrated similar illness profiles.

The mean age at illness onset, duration of illness, and duration of the current depressive episode did not differ significantly between groups. This finding is noteworthy, as Berking M and Wupperman P, linked earlier onset and chronicity with poorer emotion regulation outcomes [5]. The severity of depressive symptoms, as measured by HAM-D scores, was also similar between the two subgroups. Both groups predominantly exhibited mild depressive symptoms, indicating that emotional regulation difficulties in this context are not necessarily related to the intensity of depression. This supports emerging models that conceptualise emotion regulation as a transdiagnostic process rather than as a secondary symptom that emerges only with severe depression [26].

Biologically, serum cortisol levels were nearly identical between the groups (44.9 vs. 45.1 µg/dL), suggesting that HPA axis hyperactivity, although characteristic of depression generally [8], may not distinguish individuals with emotional regulation difficulties within depressive disorders. This finding contrasts with Staufenbiel SM et al., who associated elevated cortisol levels with poor emotion regulation, particularly under acute stress [27]. However, given the cross-sectional design of the present study and the use of basal morning cortisol measurements, it is plausible that these measures did not fully capture dynamic regulatory responses of the HPA axis, which may be more closely linked with emotion regulation under stress. Overall, the lack of significant differences across socio-demographic, clinical, and biochemical parameters suggests that emotional regulation difficulties in depression may operate independently of these observable characteristics. Instead, such impairments may be influenced more by underlying cognitive-affective processing styles, temperament, trauma history, or neurobiological factors not assessed in this study [3].

Limitation(s)

The present study had several limitations. First, as a cross-sectional study, it cannot establish causal relationships between emotional regulation difficulties, serum cortisol levels, and depression severity. The use of self-reported measures, particularly the DERS, may be subject to subjective bias and social desirability effects. Additionally, the study relied on a single morning serum cortisol measurement, which may not fully capture dynamic fluctuations in HPA axis activity or diurnal variation in cortisol secretion. Factors such as medication use, sleep patterns, and recent stress exposure, which can affect cortisol levels and emotional regulation, were not controlled for in the analysis. Furthermore, the study did not assess underlying cognitive or neurobiological mechanisms that could explain the observed associations, and the sample size did not allow for a valid comparison between symptomatic and remission-phase patients.

CONCLUSION(S)

The present study demonstrated that patients with depressive disorders exhibited significantly higher emotional regulation difficulties and elevated serum cortisol levels compared to the general population. Significant positive correlations were observed between serum cortisol levels, depression severity, and overall emotion dysregulation, highlighting the interplay between psychological and biological factors in depression. However, among patients with depressive disorders, those with and without difficulties in emotional regulation did not differ significantly in socio-demographic, clinical, or biochemical parameters, suggesting that emotional regulation impairments may operate independently of these observable characteristics. These findings underscore the importance of integrating both emotional and neuroendocrine assessments in the clinical evaluation and management of depression. Further

longitudinal and mechanistic studies are warranted to explore the underlying pathways and inform targeted interventions aimed at improving emotional regulation in depressive disorders.

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