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Original Research Article

Ecological Momentary Assessment: Assessing Levels of Expressed Emotions and Quality of Life in Patients with Depression

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Abstract: ***Background***: Expressed Emotion (EE) within the family environment is a known predictor of relapse in depressive disorders. Traditional assessment methods often suffer from recall bias. Ecological Momentary Assessment (EMA) offers a "real-time" alternative to capture the dynamic nature of emotions and Quality of Life (QoL). ***Objectives:*** 1. To assess the quality of life in adult patients with depression using ecological momentary assessment. 2. To assess the expressed emotions in patients with depression using ecological momentary assessment. ***Methods:*** A prospective study of 156 adult patients was conducted at a tertiary care psychiatry department in Salem, India. Patients were assessed over 6 months. EE was measured daily via phone-based EMA using the Concise Chinese Level of Expressed Emotions Scale (English version), and QoL was assessed monthly. ***Results:*** High EE was present in 43.6% of the study participants. Hostility (28.2%) was the most prevalent negative EE domain. A strong significant association was found between High EE and severe depression ($p < 0.001$). Patients in High EE environments reported significantly lower QoL scores (7.47 ± 3.37) compared to those in Low EE environments (13.91 ± 3.47). QoL showed a linear decline as depression severity increased. ***Conclusion***: EMA is a feasible and sensitive tool for monitoring the psychosocial environment of depressed patients. High family EE remains a major barrier to clinical recovery and quality of life.

Keywords: Expressed Emotion; Ecological Momentary Assessment; Depression; Quality of Life; Family Environment; Hostility; Severity of Depression.

INTRODUCTION

Depressive disorders represent a global public health challenge, contributing significantly to the burden of disease and disability-adjusted life years (DALYs) [1]. While pharmacological and cognitive interventions are the mainstays of treatment, the interpersonal context in which a patient resides often dictates the long-term prognosis [2]. One of the most influential psychosocial constructs in this regard is "Expressed Emotion" (EE). The construct of Expressed Emotion evaluates the emotional climate of the family by gauging caregiver attitudes toward a family member with a psychiatric illness. It encompasses five key domains: the negative

dimensions of criticism, hostility, and emotional over-involvement (EOI), and the positive dimensions of warmth and positive remarks [3].

Although initially characterized as a predictor of clinical relapse in schizophrenia, high Expressed Emotion (EE) is now recognized as a critical determinant of outcomes in major depressive disorder. [4]. Patients returning to homes characterized by high criticism or hostility are significantly more likely to experience a recurrence of symptoms, even when adherent to medication [5]. This suggests that the emotional "temperature" of the home acts as a chronic stressor, potentially dysregulating the hypothalamic-pituitary-adrenal (HPA) axis and hindering the psychological recovery process [6].

Parallel to the concept of EE is the patient's Quality of Life (QoL). In depression, QoL is not merely the absence of symptoms but represents the patient's subjective well-being across physical, psychological, and social domains [7]. Clinical practice frequently prioritizes symptom reduction over holistic QoL metrics. Furthermore, the reliance on retrospective data collection during clinic consultations creates a methodological bottleneck. These episodic assessments are prone to recall bias, where transient fluctuations in the patient's current mood confound the accuracy of their retrospective accounts of the prior weeks' experiences. [8]

To overcome these limitations, Ecological Momentary Assessment (EMA) has emerged as a gold-standard methodology in behavioral medicine [9]. The EMA framework utilizes the systematic, real-time recording of a subject's current states and behaviors as they occur in their natural surroundings. This approach captures data proximal to the experience, allowing researchers to circumvent the cognitive distortions associated with memory while enhancing the representativeness of the data in real-world contexts. [10]

In the Indian context, where family bonds are tight and caregivers often play a central role in treatment, understanding the daily fluctuations of EE and its impact on QoL is vital [11]. This study was designed to bridge the gap in literature by using phone-based EMA to track these variables in a South Indian population, providing a more granular view of the lived experience of patients with depression [12]. Hence, this study was conducted with the following objectives: The first objective of the study was assessing the quality of life in adult patients with depression using ecological momentary assessment. The second objective of the study was assessing the expressed emotions in patients with depression using ecological momentary assessment.

MATERIAL AND METHODS

The research was designed as a prospective observational study and conducted over a six-month duration at the Department of Psychiatry, Vinayaka Mission's Kirupananda Variyar Medical College and Hospital (VMKVMCH) in Salem, Tamil Nadu. Although the initial recruitment target was informed by a pilot framework, the final sample comprised 156 adult patients to ensure adequate statistical power for comprehensive subgroup analyses. The sample size was determined a priori using G*Power software (version 3.1.9.7).

Participants were selected based on previously defined inclusion and exclusion criteria. Inclusion required patients to be between 18 and 65 years of age with a primary diagnosis of depression according to the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5) or International Classification of Diseases, 11th Revision (ICD-11) criteria. Furthermore, eligible participants were required to be on a stable therapeutic regimen including oral medications or depot injections and possess a telephone to facilitate Ecological Momentary Assessment (EMA). Conversely, individuals were excluded if they were younger than 16 or older than 65 years, or if they presented with comorbid bipolar affective disorder, intellectual disabilities, or active alcohol use disorder. To maintain a focused analysis on unipolar depression, patients diagnosed with other serious mental illnesses, such as schizophrenia, were likewise excluded from the study.

Data collection utilized several validated psychometric tools. A semi-structured sociodemographic profile sheet was employed to record variables including age, sex, religious affiliation, marital status, and primary caregiver details. The English version of the Concise Chinese Level of Expressed Emotions Scale (CC-LEES) was adapted for telephonic administration to evaluate patient perceptions of caregiver hostility, criticism, and emotional over-involvement. Subjective well-being was measured using the Mental Health Quality of Life Scale (MHQoL), a tool specifically designed to assess mental health-related status. Clinical confirmation of diagnosis and the stratification of depression severity into mild, moderate, or severe categories were conducted using DSM-5 criteria.

Following the baseline clinical assessment, the EMA protocol was initiated. The assessment of EE involved telephonic contact with patients every evening to record responses to the CC-LEES based on daily interpersonal interactions. To mitigate potential response bias and ensure data stability, these daily recordings were aggregated into 15-day and monthly averages. The MHQoL was administered at monthly intervals throughout the study period. This longitudinal methodology allowed the research team to capture nuanced "micro-

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fluctuations within the family environment that are typically overlooked in traditional retrospective reviews. Furthermore, the reliance on phone-based interviews promoted high compliance rates and ensured the inclusion of participants who may lack the digital literacy required for complex mobile applications.

Data were systematically managed using Microsoft Excel and subjected to statistical analysis via the Statistical Package for Social Sciences (SPSS) version 14.0. Descriptive statistics were utilized to summarize demographic characteristics. Inferential statistics included the application of Chi-square tests

to examine the association between categorical EE status and depression severity. Differences in mean QoL scores between High and Low EE groups were evaluated using independent t-tests, while one-way Analysis of Variance (ANOVA) was employed to compare QoL scores across the three levels of depression severity. For all analyses, a p-value of less than 0.05 was established as the threshold for statistical significance.

RESULTS

The study population comprised 156 participants with a mean age of 42.00 ± 13.64 years. Gender distribution was skewed toward females, who represented 59.0% (n=92) of the sample, while males accounted for 41.0% (n=64). Regarding religious affiliation, a significant majority identified as Hindu (87.2%), followed by Christian (7.7%) and Muslim (5.1%) minorities. Marital status data indicated that the vast majority of the population was married (84.6%), with smaller subsets identifying as unmarried (10.3%), divorced (2.6%), or widowed (2.6%). Analysis of caregiving structures revealed that husbands were the primary caregivers for 38.5% of the patients, followed by wives (28.2%), mothers (15.4%), and sons (7.7%). Other relatives, such as sisters or in-laws, provided care for the remaining 10.2% of the cohort. **(Table 1)**

Assessment of depression severity categorized 41.0% of the participants as having moderate symptoms, 35.9% as severe, and 23.1% as mild. The overall prevalence of High Expressed Emotion (EE) status was 43.6% (n=68), while 56.4% (n=88) of families exhibited Low EE status. Among the specific negative domains of EE, Hostility (HD) was the most prevalent, reported in 28.2% of cases, followed by Criticism (CD) at 20.5% and Emotional Over-Involvement (EOI) at 17.9%. The mean total Quality of Life (QoL) score for the entire study population was recorded at 11.10 ± 4.68. **(Table 2)**

A statistically significant association was observed between the presence of High EE and the clinical severity of depression ($p < 0.001$). Within the High EE group, the vast majority of patients (76.5%) presented with severe depression, whereas only 5.9% had mild symptoms. Conversely, in families where High EE was absent, only 4.5% of patients suffered from severe depression, with the majority (59.1%) exhibiting moderate symptoms and 36.4% exhibiting mild symptoms. This distribution underscores a strong correlation between a high-stress family environment and increased disease severity. **(Table 3)**

Comparative analysis demonstrated that the familial emotional climate significantly influenced the patient's perceived well-being. Patients residing in High EE environments reported a significantly lower mean QoL score of 7.47 ± 3.37. In contrast, those in Low EE environments achieved a substantially higher mean QoL score of 13.91 ± 3.47. This difference was found to be statistically significant, indicating that the presence of negative expressed emotions is associated with a marked decline in overall quality of life ($p < 0.001$). **(Table 4)**

The data revealed a clear linear decline in QoL scores as the severity of depression increased. Participants with mild depression maintained the highest QoL scores (Mean = 17.67 ± 0.96; 95% CI: 17.34–17.99). Those with moderate depression reported a mean score of 11.81 ± 1.72 (95% CI: 11.38–12.24), while patients with severe depression experienced the lowest quality of life, with a mean score of 6.07 ± 1.81 (95% CI: 5.59–6.56). ANOVA testing confirmed that these differences across severity levels were statistically significant ($p < 0.001$). **(Table 5)**

Table 1: Socio-demographic Characteristics of the Study Population (N=156)

Variable	Category	Frequency (n)	Percentage (%)
Age (Years)	Mean ± SD = 42.00 ± 13.64		
Sex	Male	64	41.0
	Female	92	59.0
Religion	Hindu	136	87.2
	Christian	12	7.7
	Muslim	8	5.1

Marital Status	Married	132	84.6
	Unmarried	16	10.3
	Divorced	4	2.6
	Widowed	4	2.6
Primary Caregiver	Husband	60	38.5
	Wife	44	28.2
	Mother	24	15.4
	Son	12	7.7
	Others (Sister, In-laws, etc.)	16	10.2

Table 2: Clinical Profile and Prevalence of Expressed Emotion (EE)

Variable	Category	Frequency (n)	Percentage (%)
Depression Severity	Mild	36	23.1
	Moderate	64	41.0
	Severe	56	35.9
Overall High EE Status	**Present**	**68**	**43.6**
	Absent	88	56.4
EE Domains	Hostility (HD) Present	44	28.2
	Criticism (CD) Present	32	20.5
	Emotional Over-Involvement (EOI) Present	28	17.9
Quality of Life (Total)	Mean ± SD	11.10 ± 4.68	--

Table 3: Association between Expressed Emotion (EE) and Depression Severity

	Mild Depression	Moderate Depression	Severe Depression	Total	P-value
High EE Present	4 (5.9%)	12 (17.6%)	**52 (76.5%)**	68	**<0.001***
High EE Absent	32 (36.4%)	52 (59.1%)	4 (4.5%)	88	
Total	36	64	56	156	

***Significant at p < 0.05 (Chi-square test)**

Table 4: Impact of Expressed Emotion on Quality of Life

Comparison of mean Quality of Life scores between patients living in High vs. Low EE environments.

Variable	Group	N	Mean QoL Score	Std. Deviation	P-value
Quality of Life	High EE (Present)	68	**7.47**	3.37	**<0.001***
	Low EE (Absent)	88	**13.91**	3.47	

***Significant at p < 0.05 (Independent t test)**

Table 5: Quality of Life scores across Depression Severity Levels

Comparison of mean Quality of Life scores across different levels of depression severity.

Depression Severity	N	Mean QoL Score	Std. Deviation	95% CI	P-value
Mild	36	**17.67**	0.96	17.34 - 17.99	**<0.001***
Moderate	64	**11.81**	1.72	11.38 - 12.24	
Severe	56	**6.07**	1.81	5.59 - 6.56	
Total	156	11.10	4.68	10.36 - 11.84	

***Significant at p < 0.05 (ANOVA)**

DISCUSSION

The findings of this study provide clear evidence that the family emotional climate is a major factor in the clinical progression of depression. By using real-time Ecological Momentary Assessment (EMA), we found that 43.6% of our patients live in "High Expressed Emotion" (High EE) households. This figure is significant when compared to global data. For instance, Hooley and Butzlaff found High EE rates ranging from 30% to 50% in Western cohorts, suggesting that urban South Indian families now mirror the high-stress environments seen in developed nations [3, 4].

Historically, research in India showed a different trend. In a classic study, Wig et al. reported much lower High EE rates of approximately 20–25% in rural North Indian settings [13]. They argued that the Indian joint family acted as a protective "buffer" for the patient. However, our result of 43.6% suggests that this buffer is weakening in our study settings. Bhugra et al. supports this by explaining that as families move to cities and shift toward nuclear structures, the emotional pressure on the primary caregiver increases [14]. A key finding in our study was that Hostility (28.2%) was the most common negative emotion, followed by Criticism (20.5%). These numbers are slightly higher than those reported in recent South Indian studies by Amaresha and Venkatasubramanian, who noted hostility rates near 22% [11]. This difference might be due to our use of EMA. Traditional studies ask patients to remember the last month, which often leads to "recall bias." Because we called patients every evening, we captured daily arguments and hostile moments that patients usually forget during a standard clinic visit [12, 15].

The correlation between High EE and depression severity was also striking. In our cohort, 76.5% of patients in High EE homes had severe depression, compared to only 4.5% in Low EE homes. This matches the findings of Leff and Vaughn, who established that patients in high-stress homes are 3 to 4 times more likely to suffer from severe symptoms or relapse [2]. Furthermore, our patients in High EE homes reported a Quality of Life (QoL) score of only 7.47, whereas those in Low EE homes scored 13.91. This significant gap confirms that even if a patient is on stable medication, a negative family environment can cut their perceived well-being nearly in half [16]. Finally, our study highlights the value of the EMA method. As Myin-Germeys points out, capturing data "in the moment" provides a much more accurate "granular view" of a patient's life than a single interview [10]. By tracking these micro-fluctuations daily, we were able to prove that the family environment is not a static background but a dynamic force that directly influences how severe a patient's depression feels on a day-to-day basis.

This study gives a detailed look at depression over time through real-time tracking (EMA), but there are a few limitations. First, since the research was done at only one hospital in South India and required everyone to own a phone, the results might not apply to people in rural areas or those with different income levels. Second, while daily phone calls help people remember their feelings more accurately, talking directly to a researcher might make patients give more positive answers just to be polite. Based on the strong link between the family environment and patient health, this study suggests moving toward a family-centered model of care. In this model, caregivers should receive psychoeducation to help them understand that symptoms like irritability and lack of energy are biological parts of depression rather than intentional behaviours. Since hostility was the most common issue found, clinical support should focus on reducing caregiver burnout, especially among spouses, to break the "vicious cycle" where family stress makes the patient's symptoms worse. Additionally, the success of using daily phone calls (EMA) suggests that doctors could use real-time monitoring or quick telephonic check-ins as an early warning system to catch rising family tension before it leads to a relapse. Finally, the goal of treatment should be expanded to focus on improving Quality of Life along with reducing symptoms, ensuring that medical care truly helps the patient function better in their daily home life. Future studies should involve multiple hospitals across different regions of India to see how cultural differences affect family dynamics and depression. It would also be helpful to use a "dyadic" approach, where both the patient and the caregiver are tracked at the same time to compare their perspectives.

CONCLUSION

This study underscores the profound impact of family Expressed Emotion on the severity of depression and the quality of life of patients. High levels of hostility and criticism are not just social issues; they are clinical variables that correlate directly with severe depressive states and poor subjective well-being. Ecological Momentary Assessment proves to be a robust and feasible methodology for capturing these dynamics in a real-world setting. Moving forward, psychiatric care must evolve beyond the individual patient to encompass the family unit, ensuring that the home environment supports rather than hinders the path to recovery.

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