Original Article

Cross-sectional study to understand Big Five Personality Traits in patients of Major Depressive Disorder

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ABSTRACT

Background: Individuals with MDD differ from non-depressed individuals upon measures of dimensional personality traits. It is found that there has been a complex and variable association between personality and depression. We can decide treatment plan, course of treatment, and prognosis based on this knowledge.
**Aims:** To study the Big Five Personality Traits in Patients of Major Depressive Disorder.
Methods: A cross-sectional study was conducted at a tertiary care hospital at the Department of Psychiatry. 100 patients were taken. Personality traits were assessed using the Big Five Inventory focused on domains like Neuroticism, Extraversion, Openness to experience, Agreeableness, and Conscientiousness. The severity of depression was assessed using Hamilton Depression Rating Scale. Other appropriate variables were obtained using semi-structured proforma. Data was analyzed with SPSS Epi Info™ v7.2.5. Linear correlation between two continuous variables was explored using Pearson's correlation (if the data were normally distributed) and Spearman's correlation (for non-normally distributed data). Statistical significance was kept at $p < 0.05$.
Results: Correlation of Big Five personality traits was studied with respect to various socio-demographic and clinical variables.
Conclusion: Personality trait Neuroticism may be a risk factor in developing major depression. Extraversion, Openness to experience, Agreeableness and Conscientiousness may be associated with some protective effect. An individual-tailored approach to management is advisable for better long-term outcomes based on personality traits.

Key Words: *Depression, big five inventory, personality traits, HDRS*
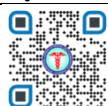
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INTRODUCTION:

Personality refers to all the characteristics that differentiate a constantly developing, self-organizing human being from a predictable machine-like object. In other words, personality refers to all the ways someone shapes and adapts in a distinctive way to an ever-changing internal and external environment.

Understanding the associations between personality and depression has several possibly important implications for research and practice.

Personality traits are associated with emotional understanding, expression, and regulation[1]
Personality may be beneficial in recognizing more homogeneous subgroups of depressive disorders[2]

Tracing the pathways between personality and depressive disorders can help reveal more proximal processes involved in the development of mood disorders[3,4,5]

Personality may be useful in tailoring treatment [6] and forecasting treatment response[7]

Temperament/personality may provide a means to identify at-risk individuals who could help in prevention and early intervention efforts [8].

A variety of personality classifications have been suggested over the past century, but in the 1980s they were incorporated into a consensus taxonomy, the Five-Factor Model (FFM).

The "Big Five" traits are neuroticism, extraversion, conscientiousness, agreeableness, and openness to experience. [9]

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A considerable amount of experimental research has demonstrated a significant association between Neuroticism, a personality aspect characterized by a general tendency to experience negative affects, and depression [10,11,12]

Neuroticism has been recommended to be a predisposing factor to clinical depression [13,14] and it is associated with depression of nonclinical severity[15,16]

Contrary to Neuroticism, Extraversion reflects positive emotionality and is characterized by a predisposition to experience positive emotions.

Three traits in particular—high neuroticism, low extraversion, and low conscientiousness—have been associated with depressive symptoms in both healthy and patient populations [17].

Depression is the leading source of disability worldwide and is a major contributor to the overall global burden of disease. [18,19] Regardless of severity, depression is associated with poor physical function, greater healthcare consumption, morbidity, and increased mortality[19,20].

Sadly, one-fourth of individuals with depression are left undiagnosed [21] and fewer than half receive treatment, [22,23] resulting in accelerated decline in physical health and overall quality of life. Bearing in mind the widespread implications of depression, it is imperative to elucidate the principal mechanisms associated with depressive symptoms[24].

Depressive disorders affect one in five women and one in ten men at some time during their lives. Regardless of the availability of effective treatments, many persons with mood disorders are incapacitated. The suboptimal outcome of mood disorders recognized in recent research reports cannot be attributed to under diagnoses and under treatment alone, for numerous reasons. Depressed individuals exhibit elevated levels of broad traits such as neuroticism, negative emotionality, negative affectivity, and harm avoidance, as well as more specific vulnerability factors such as self-criticism, dependency, and perfectionism[25,26,27].

Can personality information be of assistance in the treatment of individuals with MDD? Indeed, there are a variety of ways in which personality features may play a role in the treatment of MDD.

A consideration of the connection between personality and depression requires attention to an abundance of hypothetical, empirical, and methodological complexities[28].

Need of the study:
Personality can have a crucial role in the causation, prognosis, and treatment outcome of psychiatric disorders. In that also Major Depressive Disorder is one such disorder that is linked to personality traits much more than many other disorders. However, not many scientific studies have been done in this area in India. Our study can be a pioneer and inspire further large-scale studies about personality studies.

Aims and Objectives:
To understand the big five personality traits in patients with major depressive disorder
To study the correlation of the big five personality traits with clinical and socio-demographic variables.

Materials and Methods:
This is an observational study in the clinical setting on outdoor patients

Setting:
The study was carried out at the tertiary care hospital set up in the Department of Psychiatry, Pandit Deendayal Upadhyay (PDU)Government Medical College and Hospital, Rajkot. The study was done during the period from January 2022 to December 2022. The study sample consisted of 100 patients of MDD diagnosed as per DSM-5 criteria. Patients were clinically evaluated with history and mental status examination.

Inclusion Criteria:
• Patients diagnosed clinically to have Major Depressive Disorder according to DSM 5 criteria.
• Age group 18 to 75 years.
• Patients who are ready to give informed written consent.
• Patients who can communicate in Gujarati or English.
• Those who can give the necessary information.

Exclusion Criteria:
• Patients of MDD with psychotic features.
• Those who have bipolar mood disorder.

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• Those who have other major psychiatric disorders like psychotic disorders, substance use disorders except tobacco use disorder.

Methodology:
Sample:
For the study, 100 patients were interviewed. For sample selection, we used systematic randomization. The diagnosis was confirmed by detailed clinical evaluation with history and mental status examination as per DSM-5 diagnostic criteria.

Assessment of personality traits:
It was done by the Big Five Inventory having 44 questions. Five subscales are Extraversion (8 items), Agreeableness (9 items), Conscientiousness (9 items), Neuroticism (8 items) and Openness (10 items). Participants rate each BFI item on a 5-point scale ranging from 1 (disagree strongly) to 5 (agree strongly); scale scores are computed as the participant's mean item response (i.e., adding all the items scored on a scale and then dividing by the number of items on the scale). A high subscale score indicated that the individual rated high on that personality dimension and the inverse is true for a low score. The Gujarati version was used to self-administer the scale. The BFI has shown excellent psychometric qualities and has been used extensively in different contexts and cross-cultural studies[29].

Assessment of depression:
This was done using the 17-item Hamilton Depression Rating Scale (HDRS). Score 0-7 is generally accepted to be within the normal range; 8-13 mild depression; 14-18 moderate depression; 19-22 severe depression; >23 very severe depression. A recent study reported an internal consistency coefficient of 0.83 for $HDRS_{17}$. [30]

Semi Structured Proforma:
It contains socio-demographic and clinical details. Socio-demographic details include age, sex, area of domicile, religion, type of family, relationship status, education, occupation, monthly income, and per capita income. Clinical details include specifier according to DSM-5, Past History of Depression, Total Number of Depressive Episodes, Duration of Current Episode, Total Duration (Years), Severity of Depression, Family History, and Physical Illness.

Data analysis:
All the collected data was appropriately tabulated in Excel sheet and data was analyzed with SPSS Epi Info™ v7.2.5 [31]. Descriptive statistics were presented in the form of means/standard deviations and medians/IQRs for continuous variables and frequencies and percentages for categorical variables. Data were also appropriately presented in a graphical manner using histograms for continuous data and bar charts for categorical data. Linear correlation between two continuous variables was assessed using Pearson's correlation (if the data were normally distributed) and Spearman's correlation (for non-normally distributed data). Statistical significance was decided to be kept at $p < 0.05$.

Ethics:
Our study was accepted by the Institutional Ethics Committee (Human). Written informed consent was acquired from all the participants before their enrolment in the study. All procedures performed in this study were following the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments or analogous ethical standards.

1. Personality Traits of Cases as per Big Five Inventory

Big Five Inventory	Mean ± SD	Median (IQR)	Min - Max
Extraversion	3.28 ± 0.75	3.25 (2.75-3.78)	1.2 - 4.9
Agreeableness	3.90 ± 0.68	4.00 (3.44-4.36)	1.3 - 5.0
Conscientiousness	3.53 ± 0.74	3.67 (3.11-4.00)	1.4 - 4.8
Neuroticism	3.34 ± 0.91	3.44 (2.50-4.00)	1.4 - 5.0
Openness	2.64 ± 0.95	2.60 (2.00-3.30)	1.0 - 4.6

2. Severity of Depression as per HDRS in Cases

HDRS	Mean ± SD || Median (IQR) || Min-Max || Frequency (%)
HDRS	10.61 ± 6.23 || 11.00 (6.00-15.25) || 0.00 - 27.00
HDRS Category (Severity)	
0-7 (Remission)	29 (29.0%)
8-13 (Mild)	37 (37.0%)
14-18 (Moderate)	24 (24.0%)
19-22 (Severe)	7 (7.0%)
≥23 (Very Severe)	3 (3.0%)

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3. Association between Severity of Depression and Personality Trait Extraversion

Big Five Inventory: Extraversion	HDRS Category (Severity)					Kruskal Wallis Test	
	0-7 (Remission)	8-13 (Mild)	14-18 (Moderate)	19-22 (Severe)	≥23 (Very Severe)	χ2	p value
Mean (SD)	3.38 (0.79)	3.30 (0.68)	3.19 (0.75)	3.09 (1.06)	3.25 (0.90)	1.080	0.897
Median (IQR)	3.38 (2.75-3.88)	3.38 (2.88-3.75)	3.12 (2.72-3.56)	3.75 (2.44-3.81)	3 (2.75-3.62)		
Min - Max	1.88 - 4.88	1.62 - 4.5	2.12 - 4.75	1.25 - 4.12	2.5 - 4.25		

The variable Big Five Inventory: Extraversion was not normally distributed in the 5 subgroups of the variable HDRS Category (Severity). Thus, non-parametric tests (Kruskal Wallis Test) were used to make group comparisons.
There was no significant difference between the groups in terms of Big Five Inventory: Extraversion (χ2 = 1.080, p = 0.897).
Strength of Association (Kendall's Tau) = 0.07 (Little/No Association)

4. Association between Severity of Depression and Personality Trait Agreeableness

Big Five Inventory: Agreeableness	HDRS Category (Severity)					Kruskal Wallis Test	
	0-7 (Remission)	8-13 (Mild)	14-18 (Moderate)	19-22 (Severe)	≥23 (Very Severe)	χ2	p value
Mean (SD)	4.05 (0.49)	3.98 (0.61)	3.83 (0.75)	3.27 (1.10)	3.44 (0.77)	4.592	0.332
Median (IQR)	4 (3.78-4.44)	4.11 (3.56-4.33)	4.06 (3.31-4.56)	3.56 (2.67-4.17)	3 (3-3.67)		
Min - Max	2.89 - 5	2.56 - 5	2.22 - 4.67	1.33 - 4.33	3 - 4.33		

The variable Big Five Inventory: Agreeableness was not normally distributed in the 5 subgroups of the variable HDRS Category (Severity). Thus, non-parametric tests (Kruskal Wallis Test) were used to make group comparisons.
There was no significant difference between the groups in terms of Big Five Inventory: Agreeableness (χ2 = 4.592, p = 0.332).
Strength of Association (Kendall's Tau) = 0.13 (Small Effect Size)

5. Association between Severity of Depression and Personality Trait Conscientiousness

Big Five Inventory: Conscientiousness	HDRS Category (Severity)					Kruskal Wallis Test	
	0-7 (Remission)	8-13 (Mild)	14-18 (Moderate)	19-22 (Severe)	≥23 (Very Severe)	χ2	p value
Mean (SD)	3.70 (0.66)	3.55 (0.62)	3.47 (0.72)	2.73 (1.14)	3.93 (1.10)	6.192	0.185
Median (IQR)	3.89 (3.11-4.22)	3.67 (3.22-3.89)	3.44 (2.92-3.94)	2.56 (1.72-3.83)	4.44 (3.56-4.56)		
Min - Max	2.44 - 4.78	1.44 - 4.67	2.33 - 4.67	1.44 - 4	2.67 - 4.67		

The variable Big Five Inventory: Conscientiousness was not normally distributed in the 5 subgroups of the variable HDRS Category (Severity). Thus, non-parametric tests (Kruskal Wallis Test) were used to make group comparisons.
There was no significant difference between the groups in terms of Big Five Inventory: Conscientiousness (χ2 = 6.192, p = 0.185).
Strength of Association (Kendall's Tau) = 0.13 (Small Effect Size)

6. Association between Severity of Depression and Personality Trait Neuroticism

Big Five Inventory: Neuroticism	HDRS Category (Severity)					Kruskal Wallis Test	
	0-7 (Remission)	8-13 (Mild)	14-18 (Moderate)	19-22 (Severe)	≥23 (Very Severe)	χ2	p value
Mean (SD)	3.03 (0.91)	3.42 (0.73)	3.47 (1.02)	3.71 (1.21)	3.54 (1.06)	5.173	0.270
Median (IQR)	2.88 (2.38-3.88)	3.5 (2.88-3.88)	3.31 (2.59-4.41)	4 (2.75-4.75)	3.5 (3-4.06)		
Min - Max	1.38 - 4.5	1.88 - 4.62	1.75 - 5	2.12 - 4.88	2.5 - 4.62		

The variable Big Five Inventory: Neuroticism was not normally distributed in the 5 subgroups of the variable HDRS Category (Severity). Thus, non-parametric tests (Kruskal Wallis Test) were used to make group comparisons.

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There was no significant difference between the groups in terms of Big Five Inventory: Neuroticism ($\chi2$ = 5.173, p = 0.270).
Strength of Association (Kendall's Tau) = 0.17 (Small Effect Size)

7. Association between Severity of Depression and Personality Trait Openness

Big Five Inventory: Openness	HDRS Category (Severity)					Kruskal Wallis Test	
	0-7 (Remission)	8-13 (Mild)	14-18 (Moderate)	19-22 (Severe)	≥23 (Very Severe)	$\chi2$	p value
Mean (SD)	2.87 (0.92)	2.65 (0.88)	2.71 (1.02)	1.77 (0.73)	1.70 (0.75)	9.983	0.041
Median (IQR)	2.7 (2.3-3.5)	2.6 (2-3.2)	2.6 (1.95-3.73)	1.5 (1.15-2.45)	1.6 (1.3-2.05)		
Min - Max	1.2 - 4.6	1.1 - 4.6	1 - 4.5	1 - 2.7	1 - 2.5		

The variable Big Five Inventory: Openness was not normally distributed in the 5 subgroups of the variable HDRS Category (Severity). Thus, non-parametric tests (Kruskal Wallis Test) were used to make group comparisons
There was a significant difference between the 5 groups in terms of Big Five Inventory: Openness ($\chi2$ = 9.983, p = 0.041), with the median Big Five Inventory: Openness being highest in the HDRS Category (Severity): 0-7 (Remission) group.
Strength of Association (Kendall's Tau) = 0.17 (Small Effect Size)

8. Association of Personality Traits with Total number of Depressive Episodes

Sr. No.	Personality Trait	T test	
		t	P value
1	Extraversion	-0.881	0.381
2	Openness	0.239	0.812

The Big Five Personality Traits Extraversion and Openness were normally distributed. Thus, parametric tests (t-test) were used.

Sr. No.	Personality Trait	Wilcoxon-Mann-Whitney U Test	
		W	P value
3	Agreeableness	1178.500	0.683
4	Conscientiousness	1093.500	0.838
5	Neuroticism	977.500	0.294

The Big Five Personality Traits Agreeableness, Conscientiousness and Neuroticism were not normally distributed. Thus, non-parametric tests (Wilcoxon-Mann-Whitney U Test) were used.

DISCUSSION:
Association between Big Five Personality Traits and Severity of Depression was assessed using non-parametric test (Kruskal Wallis Test). No significant association was found for any of the Big Five Personality Traits.

Association between Big Five Personality Traits and Total number of Depressive Episodes was assessed using non-parametric tests (Wilcoxon-Mann-Whitney U Test) and parametric tests (t-test). No significant association was found for any of the Big Five Personality Traits.

Daniel N. Klein et al[4] found moderate to large cross-sectional associations between depression and Extraversion.

Sarah S Dermody et al[31] studied the impact of personality traits on treatment outcome for depression. Regarding Agreeableness, they found that high Agreeableness was associated with decreased depressive symptoms through agency in psychotherapeutic interventions.

Andrea P Chioqueta et al[32] reported that conscientiousness was inversely correlated with depressive symptoms and hopelessness.

Morena Zugliani et al[33] also confirmed correlations between high neuroticism and MDD which is in line with our study.

Jourdy R etal[34] stated that Current depressive episode is strongly associated with two facets of Openness to Experience (Openness to Actions and Openness to Values).

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Suggestions for future studies:

Cross-sectional correlational research design limits the causal conclusions. We cannot establish the causal relationship between personality traits and depression based on the present study as personality traits and depression can have bi-directional relationship.

Large scale community based longitudinal studies in Indian setup can help in clarifying this issue.

CONCLUSION:

Studying personality holds crucial importance in almost all psychiatric disorders. It is even more important for disorders like major depression having multifactorial etiology and variable outcome. Certain personality traits can have predictive value. If clinicians are sensitised enough towards them, a tailor made management approach can change overall outcome at personal as well as community level for mental health. Importance of non-pharmacological management gets strengthen with such studies.

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