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Study

Study of impulsivity in bipolar affective disorder across the spectrum

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ABSTRACT

Introduction: Bipolar Disorder runs across a spectrum between depression and mania. Impulsivity is known to be a core symptom of Bipolar disorder. This study aims at investigating the relationship between specific aspects of impulsivity and the affective symptoms in subjects with Bipolar Disorder. ***Methodology:*** Eligible candidates were assessed using a semi-structured proforma. The study participants were divided into four groups according to the nature of their current episode, namely: manic, depressed, mixed state or euthymic (control) group. Young's Mania Rating Scale (YMRS) and Hamilton Depression Rating Scale (HDRS) were used to assess affective symptom severity. Barratt's Impulsivity Scale (BIS-11) was used to assess state impulsivity in each participant and the collected data was then analysed for correlation with patient profile and clinical parameters. ***Results:*** Impulsivity was higher in mania ($p<0.0001$) and mixed state ($p=0.016$) as compared to control group. Attentional impulsivity was significantly impaired in all phases of Bipolar Disorder; mania ($p=0.013$), depression ($p<0.0001$) and mixed state ($p=0.001$). Motor impulsivity was higher in mixed state ($p<0.0001$) and mania ($p<0.0001$). And non-planning impulsivity was significantly higher in mixed mood states ($p=0.011$). Non-planning impulsivity worsened with age in Bipolar disorder ($p=0.012$) especially in Bipolar Depression ($p=0.005$). Impulsivity was higher in females, specifically attentional ($p=0.011$), motor impulsivity ($p=0.001$). Total impulsivity ($p=0.038$) was higher in females in Bipolar Depression. A longer duration of illness also worsened total ($p=0.022$) and attentional ($p=0.026$) impulsivity over the years. ***Conclusion:*** Impulsivity varies significantly across the spectrum of Bipolar Disorder. While mania correlates more with motor impulsivity, depression correlates with attentional impulsivity and the mixed state correlates with all three. The illness correlates and patient profile do not significantly affect the overall expression of impulsivity as a whole.

Keywords: *Bipolar, Impulsivity, Mania, Depression, Mixed*

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Bipolar disorder (BD) with a general population prevalence of 1% is traditionally considered a psychiatric disorder with good long-term prognosis, but usually shows a severe course of illness, functional and cognitive impairment, chronicity and social disability [1, 2]. It involves unusual shifts in an individual's mood, energy and activity levels, which impact his/her interpersonal relations and occupational performance, while creating an economic burden and even a suicidal risk [3].

Bipolar disorder is uniquely associated with extraordinarily high rates of co morbidity amongst psychiatric disorders, whereby two thirds of the patients are claimed to have a psychiatric co-morbidity in the form of another Axis I disorder [4, 5]. The research on impulsivity and specific affective symptoms has proved impulsivity to be a core feature of BD and is thought to underlie a number of symptom behaviors like risky sexual behavior, indiscriminate spending, reckless driving and increased suicidal ideation [1, 6]. In BD, impulsivity is related to both, mechanisms and consequences of symptoms. It plays a role in the initiation of action as a mechanism and has consequences viewed as counterproductive by society, such as substance abuse, suicidal behavior and behavioral problems like aggression [7-13].

Impulsivity has been conceptualized as a multifaceted construct i.e. a predisposition to react toward stimuli in a rapid and unplanned manner without regard to negative consequences [8]. Its broad nature is well captured in the definition that states, "Impulsivity encompasses a range of actions which are poorly conceived, prematurely expressed, unduly risky or inappropriate to the situation and that often result in undesirable consequences" [14]. Considered to be inherent to Mania and a prominent part of its diagnostic criteria, impulsivity has been repeatedly proven to be elevated in manic episodes of BD [10, 15-19]. It has also seen to be higher in Bipolar Depression as well as euthymic periods, thus being a stable trait across all mood states [16, 20-22]. Increased impulsivity in BD has also been linked to a more severe suicide attempt history [6]. It is established that combinations of depression and impulsivity are important in suicidal behavior, but impulsivity in bipolar depression may also be related to sub-clinical manic symptoms [18, 23]. An epidemiological study found that impulsive suicide attempts in bipolar depression were associated with high levels of hopelessness rather than depression [12].

Dickman attempted differentiation of impulsivity into two forms, functional vs dysfunctional. Functional impulsivity was shown to predict idea generation, enthusiasm, adventurousness and the ability to make quick decisions [24, 25]. This was especially relevant to situations where the benefits of speed outweighed the benefits of accuracy such as, social interactions requiring reasonably quick responses. Dysfunctional impulsivity, on the other hand, entailed erratic disorderliness such as distraction and inaccurate decision making as well as suicidal ideation [25-27].

Given its relevance to both healthy and harmful behaviours, the accurate assessment of impulsiveness has been of wide interest in the scientific literature. Impulsivity can be measured by behavioural laboratory measures or event-related potentials or self-report measures [8]. Self-report measures have the distinct advantage of assessing both state and trait impulsivity and also assessing multiple dimensions of impulsivity [8, 16, 17, 20, 28-32]. Commonly used self-report questionnaires for impulsivity is the Barratt's Impulsiveness Scale (BIS), used in our study [33, 34-36]. In this study, the aim was to investigate the relationship between specific aspects of impulsivity and affective symptoms in subjects with BD.

METHODOLOGY

This study is a cross-sectional, analytical type of observational study. The null hypothesis of the study was that impulsivity does not vary in various episodes of BD. Patients of BD attending the Psychiatry OPD were recruited for the study and classified into four groups as per their current mood state namely, manic, depressed, mixed episode and euthymic. Based on prevalence of BD in Indian population and the sample sizes used in previous studies, a sample size of 144 was calculated as adequate. Patient of either sex, between ages 18 and 55, diagnosed as BD as per DSM-5 criteria and willing to participate in the study was included after ruling out underlying organicity, co-morbid substance use or cognitive decline.

After taking informed consent, each participant was screened with an appropriately designed proforma, based on exclusion and inclusion criteria. A semi-structured proforma was used to record the socio-demographic data, clinical history and mental status examination of each participant, before administering the instruments of the study. The rating scales administered were:
HDRS = Hamilton Rating Scale for Depression
YMRS = Young's Mania Rating Scale, and
BIS-11 = Barratt's Impulsivity Scale

BIS-11 = Barratt's Impulsivity Scale-11

A factor structure analysis produced three factors that completed the multidimensional BIS-11 (Patton 1995; Steinberg 2012):

1. Factor I: Attentional Impulsivity (Attention + Cognitive Instability): diminished ability to focus on tasks
2. Factor II: Motor Impulsivity (Spontaneous Motor + Perseverance): acting without thinking
3. Factor III: Non-planning Impulsivity (Self-control + Cognitive Complexity): present orientation/lack of thinking about the future

Each of these scales is a validated instrument used across countries for academic and research purposes.
Participants were classified into categories based on the following cut-off scores:
Group A: Patients of BD currently mania (YMRS > 6)
Group B: Patients of BD currently depression (HDRS > 7)
Group C: Patients of BD currently mixed state (YMRS >6 and HDRS >7)
Group D: Patients of BD currently euthymic (YMRS <=6 and HDRS <=7), also served as the control group

After gathering the data for the study analysis was done with SPSS 22.0. Group comparisons for socio-demographic and clinical variables were done using independent *t* test. For comparison of parametric variable across all four groups, one way ANOVA was applied, while the Kruskal-Wallis test helped to assess distribution of non-parametric variables in the sample.

RESULTS:

The mean age of study participants was 34.35 years and mean age of onset of illness was 24.7 years. One fourth of the sample comprised of female participants. Most participants belonged to rural background and nearly 74% of the participants were from middle socio-economic status. Most of the participants were married (77.1%) and literate, mostly

belonging to nuclear families. The participants were uniformly distributed and matched as per all socio-demographic variables i.e. age, gender, area of residence, religion, socio-economic status, education, marital status, and type of family, along with duration of illness, previous episodes of illness, family history, mode of treatment and treatment compliance across all four participant groups. This distribution is comparable to other studies conducted in Indian settings and hence, deals with study population with similar distribution in terms of rural background, age group, religious interests, geographical prevalence of BD and beliefs regarding illness as per education and awareness for mental health.

Table No 1: Distribution of sample by age (in years)

Group	Minimum	Maximum	Mean	SD
Total (N=144)	19	52	34.354	7.973
BAD(M) (N=36)	19	49	35.972	7.933
BAD (D) (N=36)	20	52	35.416	7.248
BAD (Mix) (N=36)	21	45	33.667	7.910
BAD (E) (N=36)	19	45	32.361	8.559

No statistically significant difference was found in age groups of patients from all four groups (t=1.565, p=0.201). Most of the sample belonged to age group between 20 and 50 years.

Table No 2: Distribution of total sample by Gender

Sex (N=144)	BAD (M)	BAD (D)	BAD (Mix)	BAD (E)	Total sample
Males	30 (83.3%)	29 (80.6%)	24 (66.7%)	25 (69.3%)	108 (75%)
Females	6 (16.7%)	7 (19.4%)	12 (33.3%)	11 (30.7%)	36 (25%)
Total	36	36	36	36	144

No statistically significant difference was found in gender of patients across all four groups (t=3.825, p=0.281). One fourth of the population was females.

Table No 3: Distribution of total sample by Total duration of illness (in years)

Group	Minimum	Maximum	Mean	SD
Total (N=144)	0.25	30	9.658	6.525
BAD (M) (N=36)	0.25	30	11.743	7.515
BAD (D) (N=36)	1	22	9.736	5.373
BAD (Mix) (N=36)	1	25	9.778	6.577
BAD (E) (N=36)	0.5	20	7.375	5.958

Mean duration of illness for patients was 9.6 years, with higher mean illness duration in manic and lower in euthymic subjects as compared to overall population. Statistically significant difference was found in total duration of illness of patients when compared across the four groups [F(3,140)=2.802, p=0.042], where distribution of patients in four groups was not found to be uniform with respect to duration of illness.

Table No 4: Distribution of variables in the study population

Variable	Minimum	Maximum	Mean	SD	Difference across groups
YMRS score	0	25	8.555	7.22	[F(3,140)=337.146,**p=0.000**]
HamD score	0	30	10.347	7.575	[F(3,140)=240.243,**p=0.000**]

Variable	Minimum	Maximum	Mean	SD	Difference across groups
HamA score	3	36	15.548	8.215	[F(3,140)=83.103,**p=0.000**]
BIS total score	49	86	70.465	8.159	[F(3,140)=4.856,**p=0.003**]
AI	11	28	19.312	4.052	[F(3,140)=6.523,**p=0.000**]
MI	16	33	24.361	3.884	[F(3,140)=24.616,**p=0.000**]
NPI	18	36	26.722	4.104	[F(3,140)=2.114,p=0.101]

F=correlation co-efficient, p=significance value (2-tailed)

Statistically significant difference was found across the sample in between study groups while comparing means of scores on rating scales of mania, depression and anxiety along with the total, attentional and motor impulsivity as mentioned above.

Table No 5: Comparison of impulsivity in illness groups with euthymic group (controls)

N = 36 (each)	BAD(M)	BAD(D)	BAD(Mix)
BIS total score	t = 3.801, **p = 0.000**	t = 1.294, p = 0.200	t = 2.480, **p = 0.016**
AI	t = 2.544, **p = 0.013**	t = 3.756, **p = 0.000**	t = 3.513, **p = 0.001**
MI	t = 7.174, **p = 0.000**	t = 0.269, p = 0.788	t = 4.888, **p = 0.000**
NPI	t = -1.016, p = 0.313	t = -1.384, p = 0.171	t = -2.613, **p = 0.011**

t=correlation co-efficient, p=significance value (2-tailed)

There was statistically significant difference in level of impulsivity in between each group as compared to euthymic controls as listed above. Impulsivity is raised in more domains in mixed state than mania or depression alone.

Table No 6: Comparison of impulsivity in between illness groups

N = 36 (each)	BAD(M) vs BAD(D)	BAD(D) vs BAD(Mix)	BAD(M) vs BAD(Mix)
BIS total score	t = 2.370, **p = 0.021**	t = -1.118, p = 0.239	t = 1.064, p = 0.291
AI	t = -1.796, p = 0.077	t = 0.278, p = 0.782	t = -1.500, p = 0.138
MI	t = 6.967, **p = 0.000**	t = -4.670, **p = 0.000**	t = 1.973, p = 0.052
NPI	t = 0.469, p = 0.640	t = 0.965, p = 0.338	t = 1.593, p = 0.116

t=correlation co-efficient, p=significance value (2-tailed)

Impulsivity was significantly more in mania as compared to depression on total and motor impulsivity. Between depression and mixed states, motor impulsivity was significantly increased in mixed states. Comparing mania with mixed states, no significant difference was found in expression of impulsivity.

Table No 7: Effect of age on Impulsivity in Bipolar disorder

Variable	Total sample (N = 144)	BAD(M) (N=36)	BAD(D) (N=36)	BAD(Mix) (N=36)	BAD(E) (N=36)
BIS total score	t = 0.161, p = 0.054	t = -0,018, p = 0.919	t = 0.012, p = 0.946	t = 0.190, p = 0.267	t = 0.307, p = 0.068
AI	t = 0.067, p = 0.423	t = 0.151, p = 0.378	t = -0.280, p = 0.086	t = 0.263, p = 0.121	t = 0.239, p = 0.086
MI	t = 0.053, p = 0.525	t = 0.109, p = 0.526	t = -0.261, p = 0.125	t = 0.045, p = 0.794	t = 0.290, p = 0.086
NPI	t = 0.209, **p = 0.012**	t = 0.215, p = 0.207	t = 0.458, **p = 0.005**	t = 0.088, p = 0.608	t = 0.142, p = 0.408

t=Pearson's correlation co-efficient, p=significance value (2-tailed)

In the sample population, impulsivity did not appear to vary significantly with age, except for higher overall non-planning impulsivity. Likewise, it was also significantly impaired with advancing age in bipolar depression.

Table No 8: Effect of gender on Impulsivity in Bipolar disorder

Variable	Total sample (N = 144)	BAD(M) (N=36)	BAD(D) (N=36)	BAD(Mix) (N=36)	BAD(E) (N=36)
BIS total score	t = -1.163, p = 0.247	t = -1.629, p = 0.113	t = -2.150, **p = 0.038**	t = -0.596, p = 0.555	t = 0.914, p = 0.367
AI	t = -1.709, p = 0.090	t = -1.286, p = 0.207	t = -2.697, **p = 0.011**	t = 0.726, p = 0.473	t = -1.364, p = 0.182
MI	t = -0.692, p = 0.490	t = -0.704, p = 0.486	t = -3.564, **p = 0.001**	t = -0.444, p = 0.660	t = 1.504, p = 0.142
NPI	t = -0.093, p = 0.926	t = -1.190, p = 0.242	t = 0.764, p = 0.450	t = -1.765, p = 0.087	t = 2.059, **p = 0.047**

t=Pearson's correlation co-efficient, p=significance value (2-tailed)

In the overall sample, gender did not play a significant role in manifestation of impulsivity. In Bipolar depression, total, attentional and motor impulsivity were all found to be significantly more impaired in females. The control group showed significantly higher deficits in non-planning impulsivity.

Table No 9: Effect of Total duration of illness on Impulsivity in Bipolar disorder

Variable	Total sample (N = 144)	BAD(M) (N=36)	BAD(D) (N=36)	BAD(Mix) (N=36)	BAD(E) (N=36)
BIS total score	t = 0.191, **p = 0.022**	t = -0.008, p = 0.964	t = 0.191, p = 0.264	t = 0.206, p = 0.229	t = 0.159, p = 0.355
AI	t = 0.186, **p = 0.026**	t = -0.074, p = 0.669	t = 0.117, p = 0.495	t = 0.308, p = 0.068	t = 0.243, p = 0.153
MI	t = 0.154, p = 0.065	t = -0.079, p = 0.648	t = -0.033, p = 0.850	t = 0.172, p = 0.315	t = 0.147, p = 0.392
NPI	t = 0.460, p = 0.584	t = 0.114, p = 0.570	t = 0.243, p = 0.153	t = -0.038, p = 0.825	t = -0.043, p = 0.802

t=Pearson's correlation co-efficient, p=significance value (2-tailed)

Impulsivity, especially attentional, showed increasing trend as duration of illness increased in overall sample population of Bipolar disorder. Neither mania nor Bipolar depression/ mixed states showed any significant impact of duration of illness on manifestation of impulsivity. There was no significant effect of illness duration evident on impulsivity level in euthymic group.

DISCUSSION

In the past several decades, the role of impulsivity in pathogenesis of various neuropsychiatric disorders has become increasingly evident. Impulsivity is proposed to contribute to a wide range of psychopathology, including: bipolar disorder; attention deficit hyperactivity disorder; borderline personality disorder; alcohol and substance dependence; pathological behaviours triggered by Parkinson's disease medication; as well as suicidality, a feature of several different disorders [22, 37-42].

A large investigative study of impulsivity and illness characteristics with course of Bipolar disorder has associated higher impulsivity with early onset, longer illness, more frequent episodes of illness, and a history of suicide attempts, despite age, gender and education taken into account [43]. A few studies have denied a direct correlation between illness severity and impulsivity, stating that impulsivity is a multi-faceted construct and presents itself in a complex fashion, based on a dynamic inter-play between inherent behavioural traits, up-bringing, personality traits, cognitive resilience, and influence of psycho-active substances, stress levels, emotional state and psychiatric disorders, amongst many others [44].

Impulsivity and suicide

Javdani et al reported a unique contribution of impulsive traits to suicide attempts and self-injurious behaviours [45]. Dougherty and colleagues studied suicidal behaviour in young adolescents with BD and found an association between past history of suicide attempt and higher motor impulsivity [41]. Swann et al studied impulsivity and suicidality in BD and found that subjects with history of suicide attempts showed more impulsive errors on immediate memory and shorter response latencies for impulsive responses, irrespective of mood state. They also reported that patients with more suicidality have higher deficits in response inhibition and attention and associated higher impulsivity with more medically severe suicidal attempt [6]. Perroud et al evaluated predictors of suicidal behaviours (SB) in BD and found that SB were characterised by behavioural dysregulation, due to impulsivity and aggression. Impulsivity had a strong correlation with aggressive traits which were specifically related to SB, thus throwing light on the need for systematic assessment of impulsive aggression in mood disorder, for proper addressal of suicidal risk [46]. In our study, significantly higher levels of total impulsivity, including its components in mixed mood states also indicated an overall high risk of suicide.

Several studies mention impulsivity and its link with attention. Sonuga described impulsivity as a distinct psychological process from lapses in attention, but also consider errors in attention system to result in impulsive behaviour [47]. Levine et al tested impulsivity and its relation with distractibility and found that higher impulsivity levels correlated significantly with higher scores on a measure of academic distractibility [48]. In this study attentional impulsivity was found to be significantly raised across all mood states.

IMPULSIVITY AS A TRAIT

Numerous studies point towards both state and trait impulsivity primarily implicated in BD [16, 17, 20-22, 49, 50]. In contrast to impulsivity related to current mood (state-like impulsivity), several studies of euthymic subjects have suggested trait-like impulsivity to be a core feature of BD [21, 50]. Newman conducted a review on impulsivity in euthymic bipolar patients and reported some facets of impulsivity seen in perception of the self during euthymia. The study quoted that 'it is still unclear whether elevated impulsivity is a vulnerability factor for developing BD and exists even before the onset of the disorder, or a consequence of BD, as residual symptom, a reference to previous mood-related behaviour' [51]; however, some evidence does provide a tentative proof of impulsivity to be a vulnerability marker for BD [52-54]. Swann et al postulated trait impulsivity to potentially worsen the course of BD, either as a consequence of the instability of illness or as a predisposition [18]. Gilbert et al also found total impulsivity and its attentional and motor components to be significantly higher in the euthymic bipolar subjects as compared to healthy adolescents, suggesting the trait feature of impulsivity [55]. Saddichha reviewed the literature on impulsivity measures using database searches and generating weighted mean difference (WMD) scores for depression in the pooled data. A WMD of 10.12 was generated for total impulsivity on BIS-11, which suggested that there is a strong association between impulsivity and depression, which persists even in remission [56]. Jimenez and colleagues studied impulsivity and functional impairment in remitted patients of BD, in order to predict the role trait-of impulsivity in influencing functional outcome. A significant independent impact of trait impulsivity (euthymic phase) was revealed on overall functional impairment (p=0.004), other than the number of hospitalisations and depressive symptoms [57]. In our study, non-planning impulsivity was found to be significantly higher in euthymic female patients of BD, indicating both, presence of trait anxiety and a higher occurrence of impulsive, risk-taking behaviours in females, even during remission.

Mixed mood state

Akiskal sought to determine the relationship between mixed states and suicidality. Mixed states did not predict either suicidal ideation or attempt, but contributed independently to the risk of non-fatal suicidal behaviour in girls. It was seen that girls showed nearly 4 times the risk of having made a suicide attempt on account of mixed state (OR = 3.9, $p = 0.003$), replicating the high frequency of mixed states in women found in literature [58]. This highlights the importance of wider recognition of bipolar mixed states masquerading as unipolar depression in patients [59]. In our study impulsivity was seen to be worsened in all domains in the mixed state group, i.e. total, attentional, motor and non-planning impulsivity, thus reflecting the greater extent of worsening of impulsivity in co-existence of manic and depressive symptoms, as also shown by Swann and colleagues. They found greater impulsivity, substance abuse and suicide attempts with even modest manic symptoms during bipolar depressive episodes. Thus, superimposed manic symptoms during depressive episodes were seen as potentially dangerous and in lines with mixed mania, notorious for a worse overall course of illness and more difficult to treat than episodes of depression or mania alone [18, 60-64]. Hence, a therapeutic implication for effective management of mixed states is highlighted.

Impulsivity and Age

Intelligence is related to efficiency of cognitive function in a manner that may interact with impulsivity [7]. Education and age have been considered to influence impulsivity and confound the interpretation of variations in impulsivity relative to illness course, by interfering with completion of education, consistent with the report that educational

attainment was less in subjects with bipolar disorder than in controls, with comparable IQ [65]. On the other hand, higher age and education can potentially provide cognitive tools for counteracting impulsivity [65, 66]. In the current study, only non-planning impulsivity seemed to worsen with age in BD, especially during depression.

Impulsivity and Gender

Studies indicate that gender is not strongly related to impulsivity in bipolar disorder [43].
A meta-analytic review on the other hand states gender to play a role in moderating impulsive behaviour in adolescents, with a large effect size in females ($\beta = 0.22$, $p = 0.04$) [67]. Kesebir et al found a moderate inverse relation between impulsivity and self-esteem, which is stronger in women than men and hence lesser impulsivity than men [68]. In a study exploring the relationship between mood state and impulsive suicidal behaviour, a univariate logistic regression revealed that girls had more than twice the risk of having suicidal ideation (OR = 2.2, $p = 0.004$) and nearly 3 times the risk of having histories of a suicide attempt than boys (OR = 2.87, $p < 0.0001$) [58]. In our study total, attentional and motor impulsivity were found to be significantly more impaired in depressed females and significantly higher deficits in non-planning impulsivity were found in euthymic female patients. This finding points to an increased expression of impulsivity and resultant behavioural abnormalities in the female population, especially during depression and despite remission.

Impulsivity and duration of Bipolar illness

Study of individual role of total duration of illness in Bipolar disorder on the manifestation of impulsivity in the current study showed that impulsivity worsened with longer illness duration, especially attentional impulsivity and motor activity. This suggests non specific role of the duration of bipolar disorder on impulsivity, irrespective of affective states, perhaps suggesting attentional impulsive deficits to manifest from declined cognitive functions, which are long term effects of an active bipolar illness [69].

CONCLUSION

The current study makes it evident that impulsivity, as a multi-faceted construct is expressed in different ways in different affective states of Bipolar disorder. While mania correlates more with motor impulsivity, depression correlates with attentional and non-planning impulsivity and the mixed state correlates with all three domains of impulsivity. The illness correlates and patient profile do not significantly affect the expression of impulsivity as a whole. Impulsive behaviours in Bipolar disorder should be carefully addressed for better quality of life, prompt control of disease progression and sustained recovery.

Limitations

The small size of sample limits the results from being generalised to a large population. Matching of samples gets restricted due to cross-sectional nature of the study. Being a cross-sectional study, the role of treatment on impulsivity could not be evaluated. Self-report measures leave scope for inaccurate rating on scales and subjective bias.

FUTURE DIRECTIONS

Further studies can be conducted with much a larger sample size, in order to substantiate the results found herein. A longitudinal work-up of the participants will unfold the complex inter-relationship between impulsivity and affective variation, and will help to objectively study the impact of pharmacological or psychosocial interventions in Bipolar disorder. A study of baseline patient profile, personality traits, co-morbid substance abuse and impulsivity in Bipolar disorder is warranted, to better understand the role of intrinsic

personality factors and extrinsic modulators (drug abuse) in expression of impulsivity in Bipolar disorder, and to have pragmatic treatment plans which fit a particular patient profile, thereby encouraging a better response to intervention. The worsening of impulsive behaviours in presence of anxiety and depression suggests the usefulness of developing specific psychotherapeutic programmes aimed at teaching the patients to identify and effectively cope with negative emotions and impulsive thoughts, thereby engaging patients in appropriate interventions and so improving prognosis. A better preparedness for impulsive behaviours in affective as well as remission states in Bipolar disorder will contribute to more efficient diagnoses and treatment, thus improving illness outcome and patient satisfaction.

REFERENCES

1. Najt, P., et al., *Impulsivity and bipolar disorder.* Eur Neuropsychopharmacol, 2007. 17(5): p. 313-20
2. Goodwin, G.M. and J.R. Geddes, *What is the heartland of psychiatry?* Br J Psychiatry, 2007. 191: p. 189-91
3. Akiskal, K.K. and H.S. Akiskal, *The theoretical underpinnings of affective temperaments: implications for evolutionary foundations of bipolar disorder and human nature.* J Affect Disord, 2005. 85(1-2): p. 231-9
4. El-Mallakh, R.S. and M. Hollifield, *Comorbid anxiety in bipolar disorder alters treatment and prognosis.* Psychiatr Q, 2008. 79(2): p. 139-50
5. McElroy, S.L., et al., *Axis I psychiatric comorbidity and its relationship to historical illness variables in 288 patients with bipolar disorder.* Am J Psychiatry, 2001. 158(3): p. 420-6
6. Swann, A.C., et al., *Increased impulsivity associated with severity of suicide attempt history in patients with bipolar disorder.* Am J Psychiatry, 2005. 162(9): p. 1680-7
7. Barratt, E.S. and J.H. Patton, *Impulsivity: Cognitive, behavioral, and psychophysiological correlates.* Biological bases of sensation seeking, impulsivity, and anxiety, 1983. 77: p. 116
8. Moeller, F.G., et al., *Psychiatric aspects of impulsivity.* Am J Psychiatry, 2001. 158(11): p. 1783-93
9. Moeller, F.G., et al., *Increased impulsivity in cocaine dependent subjects independent of antisocial personality disorder and aggression.* Drug Alcohol Depend, 2002. 68(1): p. 105-11
10. Swann, A.C., et al., *Impulsivity: a link between bipolar disorder and substance abuse.* Bipolar Disord, 2004. 6(3): p. 204-12
11. Maser, J.D. and H.S. Akiskal, *Spectrum concepts in major mental disorders.* Psychiatr Clin North Am, 2002. 25(4): p. xi-xiii
12. Simon, O.R., et al., *Characteristics of impulsive suicide attempts and attempters.* Suicide Life Threat Behav, 2001. 32(1 Suppl): p. 49-59
13. Houston, R.J., L.O. Bauer, and V.M. Hesselbrock, *Depression and familial risk for substance dependence: a P300 study of young women.* Psychiatry Res, 2003. 124(1): p. 49-62
14. Daruna, J. and P. Barnes, *The impulsive client: theory, research and treatment.* A neurodevelopmental view of impulsivity, 1993
15. Swann, A.C., et al., *Structure of mania: depressive, irritable, and psychotic clusters with different retrospectively-assessed course patterns of illness in randomized clinical trial participants.* J Affect Disord, 2001. 67(1-3): p. 123-32
16. Swann, A.C., et al., *Impulsivity and phase of illness in bipolar disorder.* J Affect Disord, 2003. 73(1-2): p. 105-11

17. Swann, A.C., et al., *Impulsivity: differential relationship to depression and mania in bipolar disorder.* J Affect Disord, 2008. 106(3): p. 241-8
18. Swann, A.C., et al., *Manic symptoms and impulsivity during bipolar depressive episodes.* Bipolar Disord, 2007. 9(3): p. 206-12
19. Swann, A.C., *Mechanisms of impulsivity in bipolar disorder and related illness.* Epidemiol Psichiatr Soc, 2010. 19(2): p. 120-30
20. Peluso, M.A., et al., *Trait impulsivity in patients with mood disorders.* J Affect Disord, 2007. 100(1-3): p. 227-31
21. Swann, A.C., et al., *Measurement of inter-episode impulsivity in bipolar disorder.* Psychiatry Res, 2001. 101(2): p. 195-7
22. Swann, A.C., *Impulsivity in mania.* Curr Psychiatry Rep, 2009. 11(6): p. 481-7
23. Soloff, P.H., et al., *Characteristics of suicide attempts of patients with major depressive episode and borderline personality disorder: a comparative study.* Am J Psychiatry, 2000. 157(4): p. 601-8
24. Brunas-Wagstaff, J., et al., *Impulsivity, interference on perceptual tasks and hypothesis testing.* Personality and Individual Differences, 1996. 20(4): p. 471-482
25. Dickman, S.J., *Functional and dysfunctional impulsivity: personality and cognitive correlates.* J Pers Soc Psychol, 1990. 58(1): p. 95-102
26. Brunas-Wagstaff, J., et al., *The relationships between functional and dysfunctional impulsivity and the Eysenck personality questionnaire.* Personality and Individual Differences, 1995. 18(5): p. 681-683
27. Dear, G.E., *Functional and dysfunctional impulsivity, depression, and suicidal ideation in a prison population.* J Psychol, 2000. 134(1): p. 77-80
28. Barratt, E.S., *Impulsiveness subtraits: Arousal and information processing.* Motivation, emotion and personality, 1985: p. 137-146
29. Gerbing, D.W., S.A. Ahadi, and J.H. Patton, *Toward a conceptualization of impulsivity: Components across the behavioral and self-report domains.* Multivariate Behavioral Research, 1987. 22(3): p. 357-379
30. Luengo, M., M. Carrillo-De-La-Pena, and J. Otero, *The components of impulsiveness: A comparison of the I. 7 Impulsiveness Questionnaire and the Barratt Impulsiveness Scale.* Personality and Individual Differences, 1991. 12(7): p. 657-667
31. Malle, B.F. and A.C. Neubauer, *Impulsivity, reflection, and questionnaire response latencies: No evidence for a broad impulsivity trait.* Personality and Individual Differences, 1991. 12(8): p. 865-871
32. Parker, J.D., R. Michael Bagby, and C.D. Webster, *Domains of the impulsivity construct: A factor analytic investigation.* Personality and Individual differences, 1993. 15(3): p. 267-274
33. Whiteside, S.P. and D.R. Lynam, *The five factor model and impulsivity: Using a structural model of personality to understand impulsivity.* Personality and individual differences, 2001. 30(4): p. 669-689
34. Schmidt, C.A., A.E. Fallon, and E.F. Coccaro, *Assessment of behavioral and cognitive impulsivity: development and validation of the Lifetime History of Impulsive Behaviors Interview.* Psychiatry research, 2004. 126(2): p. 107-121
35. Eysenck, H.J., *Dimensions of personality: 16, 5 or 3?—Criteria for a taxonomic paradigm.* Personality and individual differences, 1991. 12(8): p. 773-790
36. Patton, J.H., M.S. Stanford, and E.S. Barratt, *Factor structure of the Barratt impulsiveness scale.* J Clin Psychol, 1995. 51(6): p. 768-74
37. Winstanley, C.A., D.M. Eagle, and T.W. Robbins, *Behavioral models of impulsivity in relation to ADHD: translation between clinical and preclinical studies.* Clin Psychol Rev, 2006. 26(4): p. 379-95

38. Bornovalova, M.A., et al., *Impulsivity as a common process across borderline personality and substance use disorders.* Clin Psychol Rev, 2005. 25(6): p. 790-812
39. Ersche, K.D., et al., *Drug addiction endophenotypes: impulsive versus sensation-seeking personality traits.* Biol Psychiatry, 2010. 68(8): p. 770-3
40. Housden, C.R., et al., *Intact reward learning but elevated delay discounting in Parkinson's disease patients with impulsive-compulsive spectrum behaviors.* Neuropsychopharmacology, 2010. 35(11): p. 2155-64
41. Dougherty, D.M., et al., *Laboratory measured behavioral impulsivity relates to suicide attempt history.* Suicide Life Threat Behav, 2004. 34(4): p. 374-85
42. Klonsky, E.D. and A. May, *Rethinking impulsivity in suicide.* Suicide Life Threat Behav, 2010. 40(6): p. 612-9
43. Swann, A.C., et al., *Trait impulsivity and response inhibition in antisocial personality disorder.* J Psychiatr Res, 2009. 43(12): p. 1057-63
44. Bellani, M., et al., *Does anxiety increase impulsivity in patients with bipolar disorder or major depressive disorder?* J Psychiatr Res, 2012. 46(5): p. 616-21
45. Javdani, S., N. Sadeh, and E. Verona, *Suicidality as a function of impulsivity, callous-unemotional traits, and depressive symptoms in youth.* J Abnorm Psychol, 2011. 120(2): p. 400-13
46. Perroud, N., et al., *Impulsivity, aggression and suicidal behavior in unipolar and bipolar disorders.* Journal of affective disorders, 2011. 134(1): p. 112-118
47. Sonuga-Barke, E.J., *Psychological heterogeneity in AD/HD--a dual pathway model of behaviour and cognition.* Behav Brain Res, 2002. 130(1-2): p. 29-36
48. Levine, L.E., B.M. Waite, and L.L. Bowman, *Electronic media use, reading, and academic distractibility in college youth.* Cyberpsychol Behav, 2007. 10(4): p. 560-6
49. Strakowski, S.M., et al., *Impulsivity across the course of bipolar disorder.* Bipolar Disord, 2010. 12(3): p. 285-97
50. Peluso, M.A. and L.H. Guerra de Andrade, *Physical activity and mental health: the association between exercise and mood.* Clinics (Sao Paulo), 2005. 60(1): p. 61-70
51. Newman, A.L. and T.D. Meyer, *Impulsivity: present during euthymia in bipolar disorder?-a systematic review.* International Journal of Bipolar Disorders, 2014. 2(1): p. 2
52. Kwapil, T.R., et al., *A longitudinal study of high scorers on the hypomanic personality scale.* J Abnorm Psychol, 2000. 109(2): p. 222-6
53. Fulford, D., S.L. Johnson, and C.S. Carver, *Commonalities and differences in characteristics of persons at risk for narcissism and mania.* J Res Pers, 2008. 42(6): p. 1427-1438
54. Giovanelli, A., et al., *Impulsive responses to positive mood and reward are related to mania risk.* Cogn Emot, 2013. 27(6): p. 1091-104
55. Gilbert, K.E., et al., *Impulsivity in Adolescent Bipolar Disorder.* Acta Neuropsychiatr, 2011. 23(2): p. 57-61
56. Saddichha, S. and C. Schuetz, *Is impulsivity in remitted bipolar disorder a stable trait? A meta-analytic review.* Compr Psychiatry, 2014. 55(7): p. 1479-84
57. Jiménez, E., et al., *Impulsivity and functional impairment in bipolar disorder.* Journal of affective disorders, 2012. 136(3): p. 491-497
58. Akiskal, H.S., *[The bipolar spectrum: research and clinical perspectives].* Encephale, 1995. 21 Spec No 6: p. 3-11
59. Dilsaver, S.C., F. Benazzi, and H.S. Akiskal, *Mixed states: the most common outpatient presentation of bipolar depressed adolescents?* Psychopathology, 2005. 38(5): p. 268-72

60. Benazzi, F., *Depressive mixed state: dimensional versus categorical definitions.* Prog Neuropsychopharmacol Biol Psychiatry, 2003. 27(1): p. 129-34
61. Akiskal, H.S. and F. Benazzi, *Validating Kraepelin's two types of depressive mixed states: "depression with flight of ideas" and "excited depression".* World J Biol Psychiatry, 2004. 5(2): p. 107-13
62. Keller, M.B., *The course of manic-depressive illness.* J Clin Psychiatry, 1988. 49 Suppl: p. 4-7
63. Turvey, C., et al., *Long-term prognosis of bipolar I disorder.* Acta Psychiatrica Scandinavica, 1999. 99(2): p. 110-119
64. Dilsaver, S.C., et al., *Depressive mania associated with nonresponse to antimanic agents.* Am J Psychiatry, 1993. 150(10): p. 1548-51
65. Glahn, D.C., et al., *Reduced educational attainment in bipolar disorder.* J Affect Disord, 2006. 92(2-3): p. 309-12
66. Barratt, E.S., et al., *Impulsive and premeditated aggression: a factor analysis of self-reported acts.* Psychiatry Res, 1999. 86(2): p. 163-73
67. Dir, A.L., A. Coskunpinar, and M.A. Cyders, *A meta-analytic review of the relationship between adolescent risky sexual behavior and impulsivity across gender, age, and race.* Clin Psychol. Rev, 2014. 34(7): p. 551-562
68. Kesebir, S., O. Gungordu, and M. Caliskan, *The relationship of self-esteem, impulsivity and temperament in bipolar patients: is it differentially related to gender?* Düşünen Adam: The Journal of Psychiatry and Neurological Sciences, 2014. 27(2): p. 126-131
69. Goldstein, T.R., et al., *History of suicide attempts in pediatric bipolar disorder: factors associated with increased risk*Bipolar Disorders, 2005. 7(6): p. 525-535

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