



ORIGINAL ARTICLE

## Impulsivity in drug-naïve panic disorder



K. Jakuszkowiak-Wojten\*, J. Landowski, M.S. Wiglusz, W.J. Cubała

Department of Psychiatry, Medical University of Gdańsk, Poland

Received 1 April 2016; accepted 5 January 2017

Available online 28 March 2017

### KEYWORDS

Impulsivity;  
Panic disorder;  
BIS-11;  
PAS;  
SCID-I

### Abstract

**Background:** Impulsivity is a key feature of numerous psychiatric disorders. However, the relationship between impulsivity and anxiety disorders is arguable and not well explored. Several methodological considerations related to data interpretation arise when patients previously exposed to psychotropic medication are included in the study population. To address those issues we designed a study in a well defined cohort of treatment-naïve panic disorder patients. **Material and methods:** This case-control study was designed to evaluate impulsivity and its dimensions in the group of 21 psychotropic drug-naïve outpatients with panic disorder and 20 healthy controls. The severity of Panic Disorder was assessed with Panic and Agoraphobia Scale (PAS). Impulsiveness was evaluated with the Barratt Impulsiveness Scale, 11th version (BIS-11). **Results:** According to our study patients with panic disorders had higher level of both total impulsivity and all impulsivity dimensions comparing to healthy controls.

**Limitations:** The number of participating subjects was relatively small. The study results apply to drug-naïve panic disorder patients without agoraphobia.

**Conclusion:** Opposing to the traditional conceptualizations suggesting that impulsivity displays a negative relationship with anxiety this study provides evidence for higher level of impulsivity in drug-naïve patients with panic disorder comparing to healthy controls.

© 2017 Asociación Universitaria de Zaragoza para el Progreso de la Psiquiatría y la Salud Mental. Published by Elsevier España, S.L.U. All rights reserved.

## Introduction

Panic disorder (PD) is common and disabling condition being associated with high burdens and characterized by a variable pattern of symptomatology.<sup>1</sup>

Impulsivity is a predisposition to rapid, unplanned reactions without regard to the negative consequences of these reactions<sup>2</sup> and is an of multifactorial concept. There are three impulsivity dimensions: attentional, motor and non-planning. Attentional impulsivity is defined as the inability to focus on the ongoing task and cognitive instability, non-planning impulsivity is the inability to plan and think carefully, orientation towards the present rather than to the future and included self-control, motor impulsivity characterizes acting on the spur of the moment (without inhibition) and perseverance.<sup>3</sup>

\* Corresponding author.

E-mail address: [k.jakuszkowiak@gumed.edu.pl](mailto:k.jakuszkowiak@gumed.edu.pl)  
(K. Jakuszkowiak-Wojten).

Impulsivity influences pathogenesis, course, clinical severity of numerous mental disorders<sup>4,5</sup> including anxiety disorders. Still, the relationship between impulsivity and anxiety disorders is controversial and not well explored. Several studies revealed high rates of comorbidity between anxiety disorders and impulse control disorders.<sup>6</sup> Studies on impulsivity in patients with comorbid anxiety disorders also uncovered similar correlation.<sup>7,8</sup> High rate in total impulsive behaviours and comorbid substance abuse in a subgroup of patients with social anxiety disorder characterized by high novelty seeking was reported.<sup>8</sup> Bipolar disorder with comorbid anxiety disorders also seems to present higher levels of impulsivity as compared to healthy controls.<sup>6,9</sup>

Some studies found no correlation between anxiety and impulsivity. Anxiety evaluated with the State-Trait Anxiety Inventory revealed negative correlation with the risk for violent behaviour.<sup>10</sup> No correlation between anxiety and impulsivity was observed in adolescents.<sup>11</sup> Studies in a sample of violent adolescents with high impulsivity levels found no correlation between anxiety and impulsivity either.<sup>12,13</sup> The divergent findings may be partly related to methodological differences including sample size, selection criteria, unmatched groups, sex, age, pharmacotherapy and different assessment tools. Anxiety and impulsivity are two main risk factors of suicidality.<sup>5</sup> The risk of suicide in panic disorder patients is partly due to a secondary depression. However it is speculated there are anxiety-specific factors which may interact with the condition of panic disorder to increase risk for subsequent depression and suicidal ideation. These factors are: severity of anxiety, anticipatory anxiety, attentional hypervigilance, avoidance of bodily sensations, fear and insanity.<sup>14</sup>

The aim of the study was to evaluate impulsivity and its dimensions in patients with panic disorder (PD). It was hypothesized that impulsivity is higher in drug-naïve PD patients than healthy controls.

## Method

### Subjects

We examined 21 psychotropic drug-naïve outpatients with PD and 20 healthy subjects. The inclusion criteria included patients between 18 and 60 years of age diagnosed with PD without agoraphobia based on SCID-I (DSM-IV-TR).<sup>15</sup> The exclusion criteria included the presence of various chronic somatic illnesses and positive history of psychotropic medication including dietary supplements.

The control group consisted of 20 healthy subjects matched by age and sex. The structured clinical interview for DSM-IV-TR non-patient edition was used to interview the healthy control.<sup>15</sup> None of them had history of serious medical illnesses. Exclusion criteria were: positive history of psychotropic medication exposure, any Axis I or II disorders.

The study was carried out in accordance with the Declaration of Helsinki with the approval of the Ethic Research Committee of the Medical University of Gdańsk, Poland. Written consent for the study was obtained from each of the participants.

## Protocol

The severity of Panic Disorder was assessed with (PAS) Panic and Agoraphobia Scale, CGI-S (Clinical Global Impression-Severity)<sup>16</sup> and SDS (Sheehan Disability Scale)<sup>17</sup>. The differentiation of anxiety and depression was screened with HADS (Hospital Anxiety and Depression Scale).<sup>18</sup>

Impulsivity was evaluated with the Barratt Impulsiveness Scale, 11th version (BIS-11). According to different studies within normal limits for impulsivity in health controls are in the range of 50–60 or between 52 and 71.<sup>19,20</sup>

## Statistical analysis

The statistical analysis was performed using StatsDirect v.2.7.9 (<http://www.statsdirect.com>). Differences between groups for discrete variables were assessed using the chi-square test, while the Student's *t*-test was used for normally distributed variables. The Mann-Whitney *U*-test was used for the remaining variables. The Pearson's correlation coefficient was used to assess correlations between the obtained variables. All tests were two-tailed. The level of significance was set at  $p < 0.05$ .

## Results

Table 1 summarizes demographic and clinical variables. There were not significant differences in terms of gender, BMI, WHR or age between patients and controls. It has revealed significantly higher levels of impulsivity in drug-naïve PD patients comparing to controls in total impulsivity [ $p < 0.0001$ ; 95% CI = 10.8 (6.0, 15.8)] and its two dimensions: attention [ $p < 0.0001$ ; 95% CI = 5.7 (3.8, 7.6)] and motor [ $p = 0.006$ ; 95% CI = 3.6 (1.1, 6.1)]. However, no significant difference was found between non-planning impulsiveness in healthy and panic disorder patients.

In post hoc analysis (Table 2) statistically significant correlation between attentional impulsivity and HADS-A (Hospital Anxiety and Depression Scale – anxiety subscale) in PD patients was found. The level of anxiety significantly correlates positively with attentional impulsivity. Exploratory analysis revealed no other correlations between impulsivity measure and clinical variables.

## Discussion

The key findings in the presented study show significantly higher levels of total impulsivity and its attentional and motor dimensions in drug-naïve PD patients as compared to healthy controls.

Our results are consistent with numerous studies reporting higher impulsivity in anxiety disorder patients.<sup>8,21,22</sup>

The study largely corroborates with Del Carlo et al.,<sup>7</sup> who revealed higher total impulsivity in all its dimensions in anxiety disorder patients than in healthy control. This study results are in line with data on impulsivity in patients receiving pharmacological treatment for anxiety disorders (e.g. panic disorder, social anxiety disorder, obsessive-compulsive disorders) presenting higher scores in total impulsivity and

**Table 1** Demographics and psychometrics of two groups.

		Panic disorder	Controls
N		21	20
Women	%	65	70
Age (years)	Median (IQR)	30 (27, 34)	31 (28, 38.5)
BMI	Mean (95% CI)	23.0 (21.1, 25.0)	23.7 (21.9, 25.5)
WHR	Mean (95% CI)	0.83 (0.78, 0.88)	0.81 (0.77, 0.85)
SNS	Mean (95% CI)	13.8	–
CGI-S	Median (IQR)	4 (4, 5)	–
PAS	Mean (95% CI)	26.5 (23.6, 29.4)	–
HADS-A	Mean (95% CI)	12.1 <sup>*</sup> (10.2, 14.0)	2.7 (1.7, 3.7)
HADS-D	Mean (95% CI)	7.4 <sup>**</sup> (5.1, 9.7)	1.3 (0.6, 1.9)
BIS attention	Mean (95% CI)	20.7 <sup>***</sup> (19.7, 22.2)	15.0 (13.7, 16.3)
BIS motor	Mean (95% CI)	23.2 <sup>#</sup> (21.0, 25.4)	19.6 (18.3, 20.9)
BIS non-plan	Mean (96% CI)	26.5 (25.0, 27.9)	24.9 (23.3, 26.4)
BIS total	Mean (95% CI)	70.3 <sup>###</sup> (66.2, 74.4)	59.5 (56.5, 62.4)

BMI (Body Mass Index), WHR (waist-hip ratio), SNS (Sheehan Disability Scale), PAS (Panic and Agoraphobia Scale), CGI-S (Clinical Global Impression Scale), HADS-A (Hospital Anxiety and Depression Scale), BIS (Barratt Impulsiveness Scale), BIS-attention (attentional), BIS-motor (motor), BIS-non-plan (non-planning), IQR (Interquartile Range), 95% CI (Confidence Interval).

<sup>\*</sup> vs Control:  $p < 0.0001$ , two-tailed unpaired  $t$ -test, mean difference (95% CI) = 9.4 (7.3, 11.5).

<sup>\*\*</sup> vs Control:  $p < 0.0001$ , two-tailed unpaired  $t$ -test, mean difference (95% CI) = 6.1 (3.8, 8.5).

<sup>\*\*\*</sup> vs Control:  $p < 0.0001$ , two-tailed unpaired  $t$ -test, mean difference (95% CI) = 5.7 (3.8, 7.6).

<sup>#</sup> vs Control:  $p = 0.006$ , two-tailed unpaired  $t$ -test, mean difference (95% CI) = 3.6 (1.1, 6.1).

<sup>###</sup> vs Control:  $p < 0.0001$ , two-tailed unpaired  $t$ -test, mean difference (95% CI) = 10.8 (6.0, 15.8).

**Table 2** PD group: correlation coefficient  $r$  (95% CI) between BIS subscales and other clinical scales.

	CGI-S	PAS	HADS-A	HADS-D
BIS-total	0.130 (–0.319, 0.532)	–0.027 (–0.453, 0.409)	0.346 (–0.101, 0.676)	–0.022 (–0.449, 0.414)
BIS-attention	–0.073 (–0.490, 0.370)	0.011 (–0.423, 0.440)	0.568 <sup>*</sup> (0.181, 0.803)	0.306 (–0.145, 0.651)
BIS-motor	0.266 (–0.187, 0.626)	–0.071 (–0.488, 0.372)	0.029 (–0.407, 0.455)	–0.201 (–0.582, 0.253)
BIS-non-plan	0.044 (–0.396, 0.466)	0.020 (–0.415, 0.448)	0.345 (–0.101, 0.676)	–0.074 (–0.490, 0.369)

BIS (Barratt Impulsiveness Scale), BIS-attention (attentional), BIS-motor (motor), BIS-non-plan (non-planning), PAS (Panic and Agoraphobia Scale), CGI-S (Clinical Global Impression Scale), HADS (Hospital Anxiety and Depression Scale).

<sup>\*</sup>  $p = 0.007$ .

its two dimensions: attentional and non-planning comparing to healthy controls.<sup>22</sup>

These results contrast with traditional conceptualization of anxiety disorders characterized by harm avoidance, hypercontrol, safety seeking, behavioural inhibition.<sup>23</sup> It seems that patients with anxiety disorder may engage in impulsive behaviour when negative internal experiences (e.g.: negative affect, uncertainty) appear as the impulsivity plays role in regulation of the negative affect and the uncertainty.<sup>24</sup> Anxiety informs about potential threat and influences cognition.<sup>25</sup> The current findings suggest that catastrophic misinterpretation of bodily symptoms is associated with difficulties tolerating the uncertainty associated with such symptoms.<sup>26</sup> In fact some people readily seek out panic-related symptoms through thrill-seeking activities, e.g. bungee jumping, but not develop panic attacks due to attribution of physical sensation to the specific activity.<sup>26</sup> Some authors speculate that anxiety may serve as a protective factor against disinhibited, potentially dangerous activities that could lead to early mortality.<sup>10</sup>

Impulsivity is related to lower 5-HT transmission.<sup>27</sup> The individuals with experimentally induced lowering of 5-HT

show increase level of impulsivity.<sup>28</sup> Impulsive responding in a novel anxiety-eliciting environment may present as behavioural disinhibition, which can be recorded as an anxiolytic-like effect.<sup>29</sup>

## Study limitations

Certain study limitations should be noted in explaining the results. First, the number of participating subjects was relatively small. Thus, the results should be replicated in a larger sample. Secondly, the study results apply to drug-naïve, non-suicidal panic disorder patients without agoraphobia being free of comorbid Axis I and II conditions. Therefore, the selection of study subjects may be reflected in the outcome limiting generalization of the results.

## Conclusions

Both, the total impulsivity level and two impulsivity dimensions (attentional and motor) were significantly higher in

drug-naïve panic disorder patients as compared to healthy controls.

The most common impulsivity indicators are: disinhibition, inability to withhold an inappropriate response, inattention/distraction, tendency to drift off during a task, fail to respond and poor decision making.<sup>30</sup> Due to increased impulsivity in panic disorder patients the level of functioning and quality of their life are lower. They often have difficulties with proper decision making, problem solving, can have problem with physical and behavioural addictions.

Patients with panic disorder need specific approach to treatment and taking into account impulsiveness dimensions which would lead to a better therapeutic response, reduced dropout rate and self-harm behaviours. It should be established whether reduction in impulsivity might result in decreasing of anxiety or conversely whether reduction in anxiety may result in reduction of impulsivity. Better understanding of these relations would provide better interventions for patients. The studies in drug-naïve population substantially contribute to the observations when subjects are controlled for medication.

Higher impulsivity seems to be an independent trait of panic disorder patients. Future research should be performed to examine the impact of impulsivity on panic disorder outcome.

## Funding/support

The project was supported from grant (02-0039/07/221) from the Medical University of Gdańsk, Poland.

The study was carried out in accordance with the Declaration of Helsinki with the approval of the Ethic Research Committee of the Medical University of Gdańsk, Poland. Written consent for the study was obtained from each of the participants.

## Contributors

Katarzyna Jakuszkowiak-Wojten designed the study and wrote the protocol. Jerzy Landowski designed the study and undertook the statistical analysis. Mariusz Wiglusz participated in the study execution. Wiesław J. Cudała managed the literature searches and analyses writing the first draft of the manuscript. All authors contributed to and have approved the final manuscript.

## Conflict of interest

None to declare.

## References

- Nutt DJ. The full cost and burden of disorders of the brain in Europe exposed for the first time. *Eur Neuropsychopharmacol*. 2011;21:715–7.
- Moeller FG, Barrat ES, Doughert DM, Schmitz JM, Swann AC. Psychiatric aspects of impulsivity. *Am J Psychiatry*. 2001;158:1783–93.
- Jakuszkowiak-Wojten K, Landowski J, Wiglusz M, Cudała WJ. Impulsivity in anxiety disorders. A critical review. *Psychiatria Danubina*. 2015;27:452–5.
- Swann AC, Pazzaglia P, Nicholls A, Dougherty DM, Moeller FG. Impulsivity and phase of illness in bipolar disorder. *J Affect Disord*. 2003;73:105–11.
- Piero A. Personality correlates of impulsivity in subjects with generalized anxiety disorders. *Compr Psychiatry*. 2010;51:538–45.
- Preve M, Mula M, Martini E, Pini S. Panic-agoraphobic spectrum symptoms are associated with impulsivity in bipolar disorder. *Ann Depress Anxiety*. 2014;1, id 1016.
- Del Carlo A, Benvenuti M, Fornaro M, Toni C, Rizzato S, Swann AC, et al. Different measures of impulsivity in patients with anxiety disorders: a case control study. *Psychiatry Res*. 2012;197:231–6.
- Kashdan TB, McKnight P, Richey JA, Hofmann SG. When social anxiety disorder co-exist with risk-prone, approach behaviour: investigating a neglected, meaningful subset of people in the National Comorbidity Survey-Replication. *Behav Res Ther*. 2009;47:559–68.
- Taylor CT, Hirshfeldt-Becker DR, Ostacher MJ, Chow CW, LeBeau RT, Pollack MH, et al. Anxiety is associated with impulsivity in bipolar disorder. *J Anxiety Disorder*. 2008;22:868–76.
- Apter A, Plutchik R, van Praag HM. Anxiety, impulsivity and depressed mood in relation to suicidal and violent behaviour. *Acta Psychiatr Scand*. 1993;87:1–5.
- Caci H, Askenazy F, Frequelin N, Nadalet L, Myquel M, Staccini P, et al. Validation of the Impulsivity Rating Scale and relationship with anxiety in healthy French adolescents. *J Affect Disord*. 1988;30:357–68.
- Askenazy F, Caci H, Myquel M, Darcourt G, Lecrubier Y. Relationship between impulsivity and platelet serotonin content in adolescents. *Psychiatry Res*. 2000;94:19–28.
- Lecrubier Y, Braconnier A, Said S, Payan C. The impulsivity rating scale (IRS): preliminary results. *Eur Psychiatry*. 1995;10:331–8.
- Schmidt NB, Wollaway-Bickey K, Bates M. Evaluating panic-specific factors in the relationship between suicide and panic disorder. *Behav Res Ther*. 2001;39:635–49.
- First MB, Spitzer RL, Gibbon M, Williams JBW. Structured clinical interview for DSM-IV-TR axis I disorders, research version, patient edition. New York: Biometrics Research, New York State Psychiatric Institute; 2002.
- Busner J, Targum SD. The Clinical Global Impression Scale. *Psychiatry*. 2007;4:28–37.
- Sheehan DV, Harnett-Sheehan K, Raj BA. The measurement of disability. *Int Clin Psychopharmacol*. 1996;11:89–95.
- Bramley PN, Easton AME, Morley S, Snaith RP. The differentiation of anxiety and depression by rating scales. *Acta Psychiatr Scand*. 1988;77:133–8.
- Swann A, Bjork JM, Moeller FG, Dougherty DM. Two models of impulsivity: relationship to personality traits and psychopathology. *Biol Psychiatry*. 2002;51:988–94.
- Stanford MS, Mathias CW, Doughert DM, Lake SL, Anderson NE, Patton JH. Fifty years of the Barrat Impulsiveness Scale: an update and review. *Personal Individ Differ*. 2009;47:385–95.
- Perugi G, Del Carlo A, Benvenuti M, Fornaro M, Toni C, Akiskal K, et al. Impulsivity in anxiety disorder patients: is it related to comorbid cyclothymia? *J Affect Disord*. 2011;133:600–6.
- Summerfeldt L, Hood K, Antony MM, Richter MA, Swinson RP. Impulsivity in obsessive-compulsive disorder: comparisons with other anxiety disorders and within tic-related subgroups. *Personal Individ Differ*. 2004;36:539–53.
- Del Carlo A, Benvenuti M, Toni C, Dell'Osso L, Perugi G. Impulsivity in patients with panic disorder-agoraphobia: the role of cyclothymia. *Compr Psychiatry*. 2013;54:1090–7.
- Pawluk EJ, Koerner N. A preliminary investigation of impulsivity in generalized anxiety disorder. *Personal Individ Differ*. 2013;54:732–7.
- Giorgetta C, Grecucci A, Zuanon S, Perini L, Balestrieri M, Bonini N, et al. Reduced risk-taking behaviour as a trait of anxiety.

- Emotion. 2012, <http://dx.doi.org/10.1037/a0029119> [advance online publication].
26. Carleton RN, Abrams MP, Asmundson GJ, Antony MM, McCabe RE. Pain-related anxiety and anxiety sensitivity across anxiety and depression disorders. *J Anxiety Disord.* 2009;23:791–8.
  27. Dalley JW, Rosier JP. Dopamine, serotonin and impulsivity. *Neuroscience.* 2012;215:42–58.
  28. Neto RCA, True M. The development and treatment impulsivity. *PSICO.* 2011;42:134–41.
  29. Harro J. Long-term partial 5-HT depletion: interference of anxiety and impulsivity. *Psychopharmacology (Berl).* 2002;164:433–4.
  30. Metcalf O, Pammer K. Impulsivity and related neuropsychological features in regular and addictive first person shooter gaming. *Cyberpsychol Behav Soc Netw.* 2014;17:147–52.