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Incidence and clinical correlates of anger attacks in Chinese patients with obsessive-compulsive disorder*

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Abstract: Objective: Anger attacks have been observed in patients with obsessive-compulsive disorder (OCD), often triggered by obsessional triggers. However, few studies have reported the clinical characteristics and correlates of anger attacks among Chinese patients with OCD. Methods: A total of 90 adults with a primary diagnosis of OCD, ranging from 15 to 78 years old, participated in the study. Participants were administered the Rage Outbursts and Anger Rating Scale (ROARS), Yale-Brown Obsessive-Compulsive Scale-Second Edition, and Brown Assessment of Beliefs Scale by a trained clinician. Patients completed the Obsessive-Compulsive Inventory-Revised and Depression Anxiety Stress Scale-21. Results: A total of 31.3% of participants reported anger outbursts in the past week, and ROARS scores had no significant correlation with age, duration of illness, OCD severity, depression, or stress. However, ROARS scores were negatively related to education level, and positively related to obsessing symptoms and anxiety. Conclusions: These data suggest that anger attacks are relatively common in Chinese patients with OCD. The severity of anger attacks is related to educational level, obsessing symptoms, and anxiety, which may be a latent variable reflecting executive functioning and emotion regulation skills.

Key words: Obsessive-compulsive disorder; Anger attacks; Assessment; China
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1 Introduction

Obsessive-compulsive disorder (OCD) is a common and debilitating neuropsychiatric disorder characterized by unwanted repetitive thoughts and/or behaviors (Hirschtritt et al., 2017). Anger outbursts (also known as rage attacks) are defined as intermittent episodes of explosive anger or aggression that are disproportionate to a given situation (Budman et al.,

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2008; Carlson et al., 2009). Recent studies of anger attacks have identified a high prevalence (54.7%) of outbursts in pediatric OCD (Storch et al., 2012) with case reports exemplifying the potential severity of this presentation (Weiss-Goldman et al., 2018). In addition, the presence of anger attacks is related to higher symptom severity in pediatric OCD, which may be a marker of more severe psychopathology (Storch et al., 2012; Johnco et al., 2015). In adults, anger outbursts are also common among patients with OCD, although rates are inconsistent. Some authors reported 20% prevalence of anger outbursts in 61 patients and others found that 50% of patients with OCD experienced anger attacks (Painuly et al., 2011a, 2011b; Wu and Storch, 2015). These studies showed consistently among adults that anger was not associated with the severity of OCD, which was different from the findings in pediatric OCD patients (Whiteside and Abramowitz, 2005). Compared with healthy controls, adults with OCD were more likely to report increased anger expression (Whiteside and Abramowitz, 2005; Moscovitch et al., 2008), whereas the group differences disappeared when depression or trait anxiety was controlled. Moreover, anger may be specially associated with some OCD symptom dimensions, including washing, ordering, and obsessing symptoms (Whiteside and Abramowitz, 2005). Radomsky et al. (2007) found that OCD patients with primary compulsive checking reported greater trait anger than controls. Furthermore, anger expression and trait anger were positively correlated with beliefs concerning perfectionism and intolerance of uncertainty among OCD checkers (Radomsky et al., 2007). Piacentino et al. (2016) also found that OCD patients with comorbid obsessive-compulsive personality disorder showed higher levels of anger/aggressiveness than OCD patients without the personality disorder.

However, the prevalence of anger attacks and its associations with demographic and clinical variables have not been investigated in Chinese patients with OCD. It is possible that individuals in China internalize distress without acting out on it, consistent with cultural norms. Therefore, the purpose of the current study was to examine the incidence of anger attacks and associated factors in Chinese patients with OCD. Based on previous researches, we predicted that increased anger attacks would not be associated with demographic characteristics such as age and education, and would not be significantly related to OCD severity. We did not have any priori hypotheses related to the association between anger attacks and specific OCD symptom dimensions.

2 Methods

2.1 Participants

Participants that met the following criteria were recruited from psychiatric clinics: (1) primary diagnosis of OCD confirmed by a psychiatrist through a clinical interview; (2) sufficient reading proficiency to complete study questionnaires; (3) cognitively able to respond to questions and questionnaires (determined by clinical judgment).

2.2 Measures

2.2.1 Clinician-rated measures

Rage Outbursts and Anger Rating Scale (ROARS): The ROARS is a 3-item clinician-rated scale that assesses frequency, intensity, and duration of anger attacks in the past week (Budman et al., 2008). Each item is scored on a 4-point scale ranging from 0 (none/absent) to 3 (anger/rage outburst ≥1 daily/severe). This measurement has demonstrated acceptable internal consistency and validity (Budman et al., 2008; Storch et al., 2012; Wu and Storch, 2015).

Yale-Brown Obsessive-Compulsive Scale-Second Edition (Y-BOCS-II): The Y-BOCS-II is the revised version of the Y-BOCS (Goodman et al., 1989a, 1989b). It comprises a symptom checklist and a severity scale. The severity scale includes 10 items measuring obsession and compulsion severity. Items are rated on a 6-point scale ranging from 0 to 5, considering behaviors over the previous week; higher scores represent greater severity. The total severity score is summed and ranges from 0 to 50. The English version of the Y-BOCS-II has demonstrated excellent psychometric properties and good construct validity (Storch et al., 2010).

Brown Assessment of Beliefs Scale (BABS): The BABS is a 7-item clinician-administered semi-structured scale that estimates insight/delusionality of beliefs in a wide variety of mental disorders (Eisen et al., 1998). It contains 7 aspects of insight including conviction, perception of others' views of a belief,

explanation of discrepant views, fixity of ideas, attempts to disprove a belief, global insight, and referential thinking. Referential thinking is not included in the total score. The score for each item ranges from 0 to 4, with higher scores representing poorer insight. The Chinese version of BABS for OCD has exhibited fair internal consistency, and convergent and divergent validity (Niu et al., 2016).

2.2.2 Self-report measures

Obsessive-Compulsive Inventory-Revised (OCI-R): The OCI-R is an 18-item self-report questionnaire assessed on a 5-point Likert scale measuring the frequency of OCD symptoms and associated distress in the past month (Foa et al., 2002). It contains 6 subscales: washing, checking, ordering, obsessing, hoarding, and mental neutralizing; each subscale has 3 items. The Chinese version of OCI-R has an adequate internal consistency and test-retest reliability (Peng et al., 2011).

Depression Anxiety Stress Scale-21 (DASS-21): The DASS-21 is a shorter 21-item version of the 42-item DASS, assessing the presence and severity of depression (DASS-D), anxiety (DASS-A), and stress (DASS-S) symptoms (Antony et al., 1998). Each item is rated on a 4-point Likert scale ranging from 0 (does not apply to me at all) to 3 (applies to me very much). Each subscale contains 7 items, and the scores are summed and doubled. The DASS-21 has shown good internal consistency and validity (Ng et al., 2007; Chan et al., 2012).

2.3 Procedure

This study was approved by local institutional review boards, and all participants provided informed consent before participating. In the case of minors, parental consent and child assent were obtained. All participants completed the self-report measures after their scheduled appointment. Clinicians completed the clinician-rated assessments during the visit.

2.4 Data analysis

The Kolmogorov-Smirnov one-sample test was used to test whether all demographic and clinical data were normally distributed. Comparison of demographic and clinical variables between groups was performed using independent samples *t*-tests for normally distributed variables, Mann-Whitney tests for abnormally distributed variables, and chi-square tests for categorical variables. Correlations between ROARS and demographic and clinical variables were examined using bivariate correlation coefficients. Significant predictive variables associated with ROARS were identified using a stepwise multiple regression analysis and the probability of F to enter was not more than 0.05. SPSS version 18.0 was used for all statistical analysis, with 2-tailed P-values of 0.05 considered significant.

3 Results

3.1 Demographic and clinical characteristics of participants

A total of 90 participants, including 46 males and 44 females, were included in this study. The mean age of participants was 33.6 years (standard deviation (SD)=14.2), and the mean duration of education was 13.1 years (SD=3.5). The age of OCD onset ranged from 7 to 70 years (mean (M)=24.0, SD=12.6), and the mean duration of OCD symptoms was 11.3 years (SD=8.9).

3.2 Prevalence of rage

Table 1 illustrates the ROARS phenomenology and Table 2 illustrates the distribution of frequency, intensity, and duration of ROARS.

Table 1 Rage phenomenology in patients with OCD

Parameter	Number	Percentage (%)
Frequency (past week)		
0	62	68.9
1–2	21	23.3
3–7	6	6.7
≥1 daily	1	1.1
Intensity		
Absent	62	68.9
Mild	15	16.7
Moderate	12	13.3
Severe	1	1.1
Duration		
None	62	68.9
≤5 min	8	8.9
6–15 min	14	15.5
≥16 min	6	6.7
Total		
None	62	68.9
Mild 1–3	6	6.7
Moderate 4–6	20	22.2
Severe 7–9	2	2.2

Table 2 Distribution of anger attack duration, severity, and intensity over the past week in patients with OCD

Parameter	Frequency				Intensity			
	0	1–2	3–7	≥1 daily	Absent	Mild	Moderate	Severe
Duration								
None	62 (68.9%)	0	0	0	62 (68.9%)	0	0	0
≤5 min	0	6 (6.7%)	1 (1.1%)	1 (1.1%)	0	6 (6.7%)	2 (2.2%)	0
6–15 min	0	10 (11.1%)	4 (4.4%)	0	0	8 (8.9%)	6 (6.7%)	0
≥16 min	0	5 (5.6%)	1 (1.1%)	0	0	1 (1.1%)	4 (4.4%)	1 (1.1%)
Frequency								
0					62 (68.9%)	0	0	0
1–2					0	14 (15.6%)	6 (6.7%)	1 (1.1%)
3–7					0	1 (1.1%)	5 (5.6%)	0
≥1 daily					0	0	1 (1.1%)	0

Data are expressed as number (percentage) of patients

The prevalence of anger attacks in this sample was 31.1% experiencing at least one episode in the past week. The percentage of anger episodes was 23.3% with 1–2 anger outbursts, 30.0% with mild to moderate intensity, and 22.2% with >5 min of episode duration. Overall, 22.2% of cases scored in the moderate range on the ROARS.

3.3 Correlation between ROARS and demographic and clinical variables

Correlations and descriptive statistics for the study variables are presented in Table 3. Kolmogorov-Smirnov tests indicated that the ROARS, BABS, washing, hoarding, ordering, and mental neutralizing scores were not normally distributed. The scores of other clinical variables exhibited a normal distribution.

Spearman correlation analysis revealed that the ROARS score was correlated with education level (r=−0.349, P<0.01), only obsessing subscale of the OCI-R (r=0.222, P<0.05) and anxiety subscale of DASS-21 (r=0.220, P<0.05). Furthermore, anger attack frequency was correlated with age (r=−0.211, P<0.05), and anger attack intensity was correlated with education level (r=−0.385, P<0.01) and anxiety subscale of DASS-21 (r=0.216, P<0.05). Furthermore, rage duration was correlated with education levels (r=−0.346, P<0.01), obsessing subscale of the OCI-R (r=0.236, P<0.05), and anxiety subscale of DASS-21 (r=0.237, P<0.05). We found no significant correlation between ROARS score and other clinical variables, such as the Y-BOCS-II, BABS, or duration of illness.

Further, a multiple stepwise regression was performed to predict anger attacks using all demographic and clinical variables. The results of the regression analysis are presented in Table 4. There were two models. Model 1 consisted of the education level and constant and the model 2 consisted of the education level, obsessing subscale score of OCI-R, and constant. The model 1 (F(1,75)=7.805, P=0.007) and model 2 (F(2,74)=7.715, P=0.001) were both significant, while the ΔR^2 of model 2 was larger than that of model 1. According to model 2, the education level and obsessing subscale score of OCI-R were found to significantly predict anger attacks.

4 Discussion

To the best of our knowledge, this is the first study to examine the characteristics of Chinese patients with OCD in relation to rage outbursts. The main findings of our study are: (1) 31.3% of participants reported rage attacks in the past week, which was mostly scored in the moderate range of rage; (2) rage had no significant correlation with age, duration of illness, OCD symptom severity, OCD checking, washing, ordering, hoarding, neutralizing symptoms, depression, or stress; (3) anger attacks were negatively related with education level, and positively related to OCD obsessing symptoms and anxiety.

Regarding the first finding, these results are consistent with Wu and Storch (2015) who found an approximately 20% incidence of anger attacks.

Table 3 Spearman correlation and descriptive statistics for study variables

Variables	ROARS	Frequency	Intensity	Duration	*M*	SD	*N*	Range
ROARS total					1.47	2.30	90	0–7
Frequency	0.983**				0.40	0.67	90	0–3
Intensity	0.995**	0.982**			0.47	0.77	90	0–3
Duration	0.988**	0.966**	0.979**		0.60	0.98	90	0–3
Y-BOCS-II	0.182	0.153	0.184	0.170	25.66	9.12	90	7–44
BABS	0.091	0.103	0.103	0.081	4.29	4.87	85	0–20
OCI-R								
Washing	0.176	0.204	0.172	0.149	4.34	4.34	85	0–12
Checking	0.045	0.012	0.044	0.037	4.55	3.88	85	0–12
Ordering	−0.043	−0.065	−0.067	−0.042	2.87	3.49	85	0–12
Obsessing	0.222*	0.170	0.201	0.236*	5.07	3.13	85	0–12
Hoarding	−0.111	−0.131	−0.133	−0.091	2.02	2.66	85	0–12
Neutralizing	0.093	0.036	0.068	0.113	2.54	3.15	85	0–12
DASS								
DASS-D	0.075	0.025	0.061	0.090	14.47	11.56	86	0–42
DASS-A	0.220*	0.171	0.216*	0.237*	12.37	9.86	86	0–42
DASS-S	0.100	0.032	0.079	0.119	17.60	11.80	86	0–42
Age (year)	−0.194	−0.211*	−0.179	−0.207	33.57	14.15	89	15–78
Education (year)	−0.349**	−0.385**	−0.344**	−0.346**	13.12	3.45	80	3–20
Age of onset (year)	−0.178	−0.170	−0.163	−0.182	24.01	12.62	71	7–70
Duration of illness (year)	−0.139	−0.180	−0.145	−0.160	11.27	8.88	71	0.25–44.00

M: mean scores of variables; SD: standard deviation of variables' scores; *N*: number of subjects having the data of variables. * $P<0.05$, ** $P<0.01$

Table 4 Stepwise regression summary with ROARS scores as dependent variables

Variables	*B*	SE	β	ΔR^2	*t*	*P* value
Model 1				0.102		0.007
Constant	4.310	1.102			3.911	0.000
Education	−0.222	0.079	−0.342		−2.794	0.007
Model 2				0.183		0.001
Constant	3.147	1.141			2.757	0.008
Education	−0.219	0.076	−0.337		−2.889	0.005
Obsessing	0.222	0.085	0.305		2.617	0.011

B: unstandardized coefficients; SE: standardized error; β: standardized coefficients; ΔR^2: adjusted *R* square

Slightly higher rates may be caused by sociocultural factors, such as high stress from society and consanguine families. However, studies in India showed higher prevalence (50%) of anger attacks in patients with OCD (Painuly et al., 2011a, 2011b). Overall, the relative frequency suggests the need to assess for anger episode presence when working with patients with OCD.

In the current study, we found that anger attack severity was positively related to obsessing symptoms and anxiety. However, Krebs et al. (2013) suggested a non-specific relationship between anger attacks and anxiety, because of a similar prevalence in OCD and non-OCD anxiety disorders. Nevertheless, we propose that anxiety may be a potential risk factor increasing the incidence of anger attacks. Whiteside and Abramowitz (2005) compared the level of anger in OCD patients with that in healthy controls, which revealed a higher level of anger expression in OCD patients and that the group difference disappeared when controlling the general distress. Previous studies indicated a significant correlation between anger and depression, which was not found in this study (Whiteside

and Abramowitz, 2004; Moscovitch et al., 2008). Furthermore, another factor, obsessing, is a common dimension of OCD, and is characterized by uncontrolled, intrusive, and unwanted thoughts that may also trigger anger outbursts. Those individuals who experience significant anxiety and/or rumination/obsessing may be more prone to irritability, reflecting more frequent anger attacks.

An interesting finding was a relationship between education level and anger attacks, which revealed that a higher education level was associated with lower severity. We speculate that education may be a latent variable reflecting executive functioning and emotion regulation skills.

There are several limitations. First, no diagnostic interview was used, although clinicians were trained and experienced in OCD assessment. Second, we did not take into account comorbid disorders, like personality disorders or axis 1 disorders, and family accommodation; we highlighted the need to study these variables in future research as these factors could act as confounding variables related to anger outbursts which might refer to another disorder rather than OCD (Moscovitch et al., 2008; Piacentino et al., 2016). Moreover, family accommodation was not examined. It is possible that rage outbursts in OCD are related to the degree of family accommodation (Storch et al., 2012), especially when symptoms are not accommodated. Third, we utilized a single time point study and did not assess momentary variables associated with anger attacks or its response to treatment. Lastly, the DASS scores were known to be associated with biological factors such as serotonin levels (Wijaya et al., 2018) and psychological factors such as shame (Yeo et al., 2017) and misophonia (Quek et al., 2018). Anger attacks were found to be related to serum levels of homocysteine in major depressive disorder (Fraguas et al., 2006). These biological and psychological factors could be potential confounders between anger attacks and OCD and require further evaluation in future research. Within these limitations, this study offers empirical evidence with respect to the prevalence of anger attacks and related factors in patients with OCD. We highlight the need for differing methodologies to assess temporal variables associated with anger attacks and other negative emotional reactions, such as ecological momentary assessment.

5 Conclusions

To our knowledge, the anger attack outburst percentage in Chinese patients diagnosed with OCD is slightly higher than those found in other studies, namely 31.3%. Higher educational level is associated with lower anger attack severity, but higher obsessing and anxiety symptoms are related to higher anger attack incidences, and vice versa. These findings suggest the need to assess for rage/anger attack presence when working with OCD patients.

Contributors

Heng-fen GONG, Fang FANG, Wen-juan LIU, and Hai-yan JIN collected data of the scales. Xiao-li ZHANG completed data entry. Ying-ying ZHANG analyzed the data and wrote the manuscript. Chen-cheng ZHANG and Eric A. STORCH revised the paper. Sophie SCHNEIDER, Elizabeth MCINGVALE, Chen-cheng ZHANG, Wayne K. GOODMAN, Xi-rong SUN, and Eric A. STORCH designed the study. All authors read and approved the final manuscript. Therefore, all authors have full access to all the data in the study and take responsibility for the integrity and security of the data.

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Compliance with ethics guidelines

Ying-ying ZHANG, Heng-fen GONG, Xiao-li ZHANG, Wen-juan LIU, Hai-yan JIN, Fang FANG, Sophie SCHNEIDER, Elizabeth MCINGVALE, Chen-cheng ZHANG, Wayne K. GOODMAN, Xi-rong SUN, and Eric A. STORCH declare they have no any conflict of interests.

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008 (5). Informed consent was obtained from all participants. In the case of minors, parental consent and child assent were obtained.

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中文概要

题　目：中国强迫症患者愤怒发作的发生率及其临床相关因素

目　的：强迫症患者的愤怒发作通常由强迫症状触发。然而，中国强迫症患者愤怒发作临床特征的相关研究报道较少。本研究主要探讨中国强迫症患者愤怒发作的发生率及其临床相关因素。

创新点：本研究是第一篇探讨中国强迫症患者愤怒发作的临床特点的研究。研究发现：教育水平越高的强迫症患者愤怒发作的严重程度越低。

方　法：九十例 15~78 岁的原发性强迫症患者参与了本研究。研究人员对患者进行了以下量表的评估：愤怒发作和愤怒严重程度量表（ROARS）、耶鲁-布朗强迫量表第二版（Y-BOCS-II）和布朗信念评估量表（BABS）。强迫症患者完成了改良强迫问卷-修订版（OCI-R）和抑郁焦虑应激量表（DASS-12）。

结　论：31.3%的强迫症患者在过去一周内有愤怒发作，ROARS 的得分与年龄、疾病病程、强迫症严重程度、抑郁和压力没有显著相关性。ROARS 得分与教育程度呈负相关，与强迫思维和焦虑程度呈正相关。

关键词：强迫症；愤怒发作；评估；中国