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Correlates of Irritability in College Students With Depressive Symptoms

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Abstract

Depression is a prevalent psychiatric disorder associated with significant personal and societal burden. There is accumulating evidence for the presence of a subtype of depression characterized by the presence of irritability that is associated with increased morbidity, risk for suicidal ideation, and functional impairments in adults. Little is known about the features of depressive symptoms with and without irritability among young adults in college. The primary aim of this study was to characterize the presentation of college students with depressive symptoms and irritability. Two-hundred eighty-seven undergraduate college students with depressive symptoms with and without irritability were compared across several psychiatric and functional outcome variables. Independent samples *t*-tests or logistic regressions were conducted for each outcome variable using the irritability item of the Beck Depression Inventory as a dichotomous grouping variable. Analyses were conducted separately for the men and the women. Both male and female students with depressive symptoms and severe irritability reported a greater severity of depressive symptoms compared with their peers with no or mild irritability. In the women, the presence of irritability was associated with greater symptoms of anxiety, whereas in the men, it was associated with increased likelihood of engaging in risky behaviors, including compulsive use of alcohol, illicit drugs, and prescription drugs. The male and female college students with depressive symptoms with and without irritability did not differ on severity of suicidal ideation, hopelessness, or cognitive functioning. The findings from this study suggest that depressive symptoms and irritability may characterize a subtype of college students who have a greater symptom burden and with the potential need for more aggressive and prompt treatment.

Keywords

Depression; irritability; young adults; risky behavior

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DISCLOSURES

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Depression is a common disabling condition (Kessler et al., 2005), second only to heart disease in terms of global disease burden (World Health Organization, 2001). However, depression is a heterogeneous disease, and the identification of phenotypes that are associated with greater risk for worse outcomes could have public health significance because treatments may be developed and tailored to specific subtypes of depression. One subtype of depression is characterized by the presence of irritability (Fava et al., 2010). Although the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (*DSM-IV*; American Psychiatric Association, 2000), does not include irritability as a symptom characterizing a diagnosis of major depressive disorder (MDD) in adults, irritable mood is one of the symptoms listed as characterizing MDD among children and adolescents. Irritable mood is defined according to the *DSM-IV-TR* as "persistent anger, a tendency to respond to events with angry outburst or blaming others, or an exaggerated sense of frustration over minor matters" (p. 349; American Psychiatric Association, 2000). Moreover, irritability is highly prevalent among depressed individuals (Painuly et al., 2011; Perlis et al., 2009). For example, the Sequenced Treatment Alternatives to Relieve Depression Study (STAR*D) revealed that significant irritability was present in 46% of the participants with MDD (Perlis et al., 2009). Similarly, in a community sample, approximately half of depressed individuals with lifetime unipolar depression reported experiencing irritability during their worse episode (Fava et al., 2010).

Reports on the clinical features associated with irritability in adults suggest that this MDD subtype may be characterized by a greater severity of symptoms. Specifically, in the STAR*D, patients with MDD and irritability had significantly greater anxiety and suicidal ideation and lower quality of life than did patients with MDD without irritability (Perlis et al., 2009, 2005). Depression with irritability has also been associated with more depressive symptoms, greater risk for co-occurrent anxiety disorders (Fava et al., 2010), and substance misuse (Pompili et al., 2009; Tarter et al., 1995). Finally, it has been observed that individuals with MDD and irritability are more likely to report drug problems (Fava et al., 2010).

Irritability is listed as a symptom that may be present in several of *DSM-IV* disorders, including bipolar disorder, generalized anxiety disorder (GAD), and posttraumatic stress disorder (Safer, 2009). It has been shown that depressive symptoms with anger attacks, which correspond to a heightened irritable mood, may be characterized by blunted prolactin response to thyrotropin-releasing hormone compared with depressed patients without irritability, suggesting greater serotonergic dysregulation (Fava et al., 2000). Moreover, MDD with anger attacks is also associated with higher severity of subcortical vascular hyperintensities and with white matter abnormalities (Iosifescu et al., 2007). Thus, biological features such as greater serotonergic dysregulation and white matter lesions may indicate a depressive disorder subtype with greater organic origin and may be at the bases of the worse psychopathology presentation and greater morbidity.

Depression is highly prevalent among college students. For example, 14.9% of college students reported a lifetime diagnosis of depression, and of these students, 32% reported being diagnosed within in the last year (American College Health Association, 2009). Among college students, depression is often associated with significant problems including

poor academic performance (Hysenbegasi et al., 2005) and increased risk for suicidal ideation (Arria et al., 2009; Garlow et al., 2008; Mackenzie et al., 2011) and alcohol and substance use (Cranford et al., 2009; Martins et al., 2012; Pedrelli et al., 2011a). Although depression is associated with these problems, not all college students with depressive symptoms have suicide ideation or anxiety or misuse substances. Therefore, identifying the characteristics of depressed students at risk for worse outcome and presentation would have significant public health implications. In light of the findings showing that irritability is a hallmark of a subtype of depression characterized by anxiety, suicidality, and poor quality of life in adult depressed individuals, depression with irritability in young adults may have similar phenotypic characteristics. However, several differences among adults and young adults are present. For example, suicide is more common among adults than among young adults (Centers for Disease Control and Prevention, National Center for Injury Prevention and Control, 2012); heavy drinking peaks at ages 21 to 23 years and then decreases with age (Substance Abuse and Mental Health Services Administration [SAMHSA], 2006); and lastly, young adults and adults differ with regard to the chronicity of the symptoms experienced that may affect presentation and severity. Thus, before generalizing findings observed among adults to young adults, a systematic examination is warranted. Further characterization of depressive symptoms among college students may inform prevention and treatment programs and the development of targeted prevention and outreach programs.

When investigating depressive symptoms and depressive subtypes, it is important to consider that men and women differ in several important ways. For example, the prevalence of depression is usually higher among women than among men (Eisenberg and Chung, 2012; Van de Velde et al., 2010), and irritability is more prevalent among depressed women than depressed men (Marcus et al., 2008). Conversely, substance use is more prevalent among male than female college students (SAMHSA, 2011). Moreover, women and men metabolize alcohol differently (Thomasson, 1995). Given these sex differences, the current study explored depression with irritability separately in men and women.

The present study investigated comorbid symptoms, risky behaviors, and physical and cognitive functioning in college students with depressive symptoms with and without irritability. It was hypothesized that the students with depressive symptoms and irritability would present with greater psychopathology, substance use, and lower functioning when compared with the students with depressive symptoms without irritability. We also predicted that the pattern of associations would differ between male and female students.

METHODS

The results of the current article are based on a subset of data drawn from a larger study (see Farabaugh et al., 2012, for a description of the parent study). Briefly, the study included undergraduate college students who gave informed consent to participate in a mental health screening at their university. Upon completion of self-report measures, the students were given a $10 voucher for their campus bookstore as a reimbursement and a list of mental health resources in the area. The current article included only the students who endorsed at least some depressive symptoms as indicated by a Beck Depression Inventory (BDI) total score of 13 or greater (Beck et al., 1961).

Participants

The 287 participants of this study are from a subsample of the parent study that included 898 college students. Overall, most of the study population was female, 64.1%; unmarried, 95.1%; and white, 54.7%, with a mean age of 19.81 years (SD, 1.87). Each of the four years of college was more or less equally represented in the cohort but with fewer seniors than freshmen, sophomores, and juniors (see Table 1).

Measures

The BDI (Beck et al., 1961) is a 21-item self-report measure of depression inquiring about the core symptoms of depression. The items are scored as 0, 1, 2, or 3, with higher scores indicating greater severity. A BDI total score is obtained by summing each item.

Item 11 of the BDI was used to assess the presence and the severity of irritability within the past week. It includes four response choices: 0, I am no more irritated now than I ever am; 1, I get annoyed or irritated more easily than I used to; 2, I feel irritated all the time now; and 3, I don't get irritated at all by the things that used to irritate me. Of note, the students who reported a score of 3 on item 11 of the BDI were excluded from the analysis (2.4%) because the item raises question of interpretation. A response of 3 does not correspond to the most severe level of irritability, although all other items on the BDI are written so that the last response represents the most severe level of psychopathology. In addition, item 11 of the BDI was excluded from the depressive severity total score because it was used as the grouping variable (independent variable).

The Beck Hopelessness Scale (BHS; Beck et al., 1974) is a self-report questionnaire that asks a respondent to answer true or false to 20 statements. Each statement indicates a positive or negative attitude regarding the future. A total score is calculated by computing the sum of all true responses to negative-attitude questions. Higher scores indicate greater hopelessness.

The Quality of Life Satisfaction Questionnaire–Short Form (Q-LES-Q–Short Form; Endicott et al., 1993) is a self-report questionnaire inquiring about physical health, general feelings of well-being, work satisfaction, leisure activities, social relationships, and life satisfaction during the past week. Possible answers range from "poor" to "very good" (1–5). Higher scores indicate greater satisfaction with life.

The Anxiety Symptom Questionnaire (ASQ; Pollack et al., 2011; Porter et al., 2010) is a 17-item self-report questionnaire measuring the frequency and the intensity of 17 symptoms of anxiety, including nervousness, worrying, irritability, trouble relaxing, insomnia, lack of energy, difficulty concentrating, somatic symptoms, and impairment in functioning due to anxiety. In a college population, the ASQ demonstrated high reliability and discriminant validity (Pollack et al., 2011).

The Suicide Behaviors Questionnaire–Revised (SBQ-R; Osman et al., 2001) is a self-report measure including four questions measuring past suicide plans, recent suicidal ideation, history of verbalization of suicidal intent or plan, and future likelihood of a suicide attempt (items 1, 2, 3, and 4, respectively).

The Massachusetts General Hospital Cognitive and Physical Functioning Questionnaire (CPFQ; Fava et al., 2009) is a seven-item questionnaire assessing cognitive and physical functioning. Each question is graded on a 6-point scale, with low scores on the CPFQ indicating higher functioning.

The Alcohol Use Disorders Identification Test (AUDIT; Bohn et al., 1995; Reinert and Allen, 2002, 2007; Saunders et al., 1993) is a 10-item questionnaire developed by the WHO to measure alcohol consumption (items 1–3), drinking behavior (items 4–6), adverse reactions to alcohol (items 7–8), and alcohol-related problems (items 9–10; Saunders et al., 1993). Each item ranges in score from 0 to 4, with an overall questionnaire score range of 0 to 40. Greater scores indicate greater alcohol problems. A total score of greater than or equal to 8 is considered indicating harmful alcohol use and possible alcohol abuse or dependence (Fiellin et al., 2000; Saunders et al., 1993).

The Consumptive Habits Questionnaire (CHQ; Pedrelli et al., 2011a) is a self-report questionnaire including two sections. One section inquires about consumption of alcohol and caffeine, and the second section inquires about the presence of several compulsive behaviors. Specifically, respondents are asked to report whether they have engaged in compulsive use of street drugs, prescriptions drugs, alcohol, and caffeine and about the presence of compulsive exercise, eating, gambling, sexual activities, spending, or buying; risk-taking behavior; or other compulsive activities. The current study investigated the relationship between severity of irritability and the likelihood of specific risky behaviors reported on this scale including compulsive use of alcohol, street drugs, and prescriptions drugs.

Data Analysis

Data were collected and analyzed using the Statistical Package for the Social Sciences (Statistical Package for the Social Sciences 17; 2009). Preliminary analyses examined the differences in the depressed male and female college students on several areas of psychopathology including depression, anxiety, suicidal ideation, cognitive and physical functioning, hopelessness, and quality of life. The preliminary analyses also assessed for the differences between the men and the women in prevalence of risky behaviors including compulsive use of alcohol, illicit drugs, and prescription drugs and hazardous drinking behavior. Analyses were conducted using univariate *t*-tests or chi-square analyses.

The sample was split into two groups: a) those with no/mild irritability (score of 0 or 1 on item 11 of the BDI) and b) those with severe irritability (a score of 2 on item 11 of the BDI). *t*-Tests were conducted to compare the two groups on irritability, psychopathology, and functioning. Binary logistic regressions were run to identify the odds ratios and 95% confidence intervals (CIs) for risky behaviors (measured by the CHQ) and hazardous drinking behavior (score of ≥8 on the AUDIT) of the students with depressive symptoms and severe irritability compared with those with no/mild irritability. These analyses were conducted separately in the men and the women.

RESULTS

With regard to severity of irritability as measured by item 11 of the BDI, 24.4% of the participants answered 0 (I am no more irritated now than I ever am), 55.1% of the participants answered 1 (I get annoyed or irritated more easily than I used to), 18.1% of the participants answered 2 (I get annoyed or irritated more easily than I used to), and 2.4% of the participants answered 3 (I don't get irritated at all by the things that used to irritate me).

The preliminary analyses showed that the female and male college students with depressive symptoms with or without irritability did not differ on a number of areas of psychopathology and functioning (Table 2). However, as illustrated in Table 3, a significantly higher proportion of the male students with depressive symptoms reported higher rates of several risky behaviors compared with their female counterparts.

Both male and female college students with significant depressive symptoms with severe irritability reported worse symptoms of depression than those of the college students with depressive symptoms and no/mild irritability (Table 4). Among the depressed male students with and without irritability, there were approximately 4 BDI points of difference, and between the depressed females with and without irritability, there were 5 BDI points of difference. The female students with depressive symptoms and severe irritability also expressed significantly greater symptoms of anxiety compared with their counterparts with no/mild irritability (Table 4). The female college students with depressive symptoms with severe irritability did not differ on any other measures of symptoms and cognitive functioning or in frequency of risky behaviors from the female college students with depressive symptoms with no/mild irritability (Table 5).

The male college students with depressive symptoms and severe irritability showed a significantly greater likelihood of several self-reported risky behaviors compared with their counterparts with no/mild irritability. Specifically, the male college students with depressive symptoms and irritability were more likely to report compulsive use of alcohol (66.7% *vs.* 25.5%), illicit drugs (61.5% *vs.* 26.8%), and prescription drugs (41.7% *vs.* 10.9%) compared with the male college students with no/mild irritability (Table 5). Although the difference between the male college students with depressive symptoms with and without irritability was large, the difference was not significant. The male college students with depressive symptoms with and without irritability did not differ on any other measure of symptoms and cognitive functioning (Table 4).

DISCUSSION

The findings from this study suggest that depressive symptoms and irritability may characterize a subtype of college students who have a greater symptom burden. In both sexes, irritability seems to be associated with more significant depressive symptoms. This finding is consistent with what was previously observed in a clinical population of adult patients with MDD seeking treatment (Perlis et al., 2009) and in a community sample (Verhoeven et al., 2011).

In the current study, irritability was associated with greater anxiety symptoms in the female but not the male students with depressive symptoms. Earlier reports (Perlis et al., 2009; Verhoeven et al., 2011) have also observed that irritability in depressed patients is associated with anxiety symptoms, but these previous studies did not examine this association separately in men and women and in young adults. Our finding may be explained by the fact that irritability is a prominent symptom of GAD according to the *DSM-IV* (American Psychiatric Association, 2000) and that GAD alone, and, similarly, GAD co-occurring with depression, is more common among women than men (McLean et al., 2011). Given that the presence of anxiety in depressed individuals may predict worse treatment outcomes and that the presence of anxiety symptoms among women is associated with a significantly high burden (McLean et al., 2011), it is critical to identify and treat co-occurring anxiety symptoms in college female students presenting with depressive symptoms and irritability. Nonetheless, it is important to consider that the difference in anxiety symptoms between the male students with depressive symptoms with and without irritability was large and that the lack of significance may have been due to lack of power. Thus, our findings ought to be considered preliminary in nature.

In our study, irritability placed the male students with depressive symptoms at greater risk for several risky behaviors, including compulsive use of alcohol, illicit drug use, and prescription drug use. The fact that approximately three of four male students with depressive symptoms and irritability in this sample reported engaging in compulsive use of alcohol is concerning given that alcohol use among college students is associated with several serious consequences including death, injury, and unsafe sex (Hingson et al., 2009; Wechsler et al., 2002) and compulsive use of alcohol is associated with a greater severity of drug problems (Pedrelli et al., 2011b). These findings highlight the importance of assessing for the presence of risky behaviors among male college students with depressive symptoms who report irritability to identify those who may benefit from psychosocial treatments targeting these behaviors in addition to depressive symptoms. The findings showed that risky behaviors were more frequent among depressed female students who reported irritability relative to those who did not, but these differences were not significant. Thus, further investigation is warranted.

Similarly to Fava et al. (2010), the current study did not find an association between depressive symptoms with irritability and quality of life or suicidal ideation. Conversely, studies on STAR*D patients described an association between irritability in depressed patients and suicidal ideation and quality of life (Perlis et al., 2009, 2005). The results of these studies may have differed for several reasons. The STAR*D study included a clinical population, whereas the current study and the study of Fava et al. (2010) included individuals from the general population. Moreover, the participants in our study were significantly younger than those in the STAR*D. We also did not observe a difference in cognitive and physical functioning depending on the presence of irritability.

Limitations

There were several limitations of the current study. First, this study had a small sample size. It is possible that the small sample size may have limited our power to detect significant

differences between the groups on some of our variables of interest (*i.e.*, quality of life, cognitive and physical functioning, hopelessness, suicide ideation). Second, the analyses were based solely on self-report instruments. Given the sensitivity of the topics being discussed, especially that of risky behaviors, it is possible that the students may not have been as forthcoming regarding their engagement in these activities. However, the self-report was anonymous, which may have facilitated accurate reporting. Third, although we found that irritability was associated with compulsive use of alcohol in the male students with depressive symptoms, there were no significant differences in the prevalence of the students with depressive symptoms with and without irritability who met the cutoff score for harmful drinking on the AUDIT scores, suggesting no difference in the likelihood to meet criteria for alcohol abuse or dependence. Alternatively, we may have not found a difference because of the small sample size and insufficient power. Fourth, given that this study had a cross-sectional design, no causality can be inferred. For example, it is also possible that irritability in the young male students may have been caused by the substance use and not vice versa. Fifth, given that anxiety symptoms and disorders are associated with increased alcohol use and substance use in general (Gilles et al., 2006; Hassan and Ali, 2011; Kushner et al., 1999) and that irritability is common in anxiety disorders, the association between the presence of risky behaviors and irritability may be explained by the presence of higher anxiety among the students with depressive symptoms and irritability. However, we were not able to test this hypothesis because of the small sample size. Finally, our study used the irritability item 11 of the BDI to assess irritability. This item is not a well-validated or in-depth assessment of irritability. However, this method of assessing for the presence of irritability may provide a relatively quick way to examine irritability during assessment visits or initial screening.

Despite these limitations, to our knowledge, the present study is the first to examine clinical correlates of irritability in college students with depressive symptoms. The findings highlight that among young adults with depressive symptoms, similarly to adults, the presence of irritability may be associated with worse symptoms and risky behaviors. The findings highlight the importance of assessing anxiety in female students with depressive symptoms and irritability and of screening for risky behaviors among male students with depressive symptoms and irritability. The prevalence of irritability among depressed college students and its association with characteristics previously observed among adults suggest that the MDD irritable subtype may also extend into the young adult age range. However, given the low prevalence in this sample of some of the behaviors investigated, which may have affected our findings, and the fact that this study included a community sample, further studies with larger samples and in clinical populations with MDD are needed.

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TABLE 1

Clinical and Demographic Variables

	Total Sample, *N* = 287	
	Mean	**SD**
Age (*n* = 269)	19.81	1.87
Grade point average (*n* = 242)	3.24	0.5
	n	%
Sex (*n* = 276)		
Female	184	64.1
Male	92	32.1
School year (*n* = 275)		
Freshman	74	25.8
Sophomore	73	25.4
Junior	70	24.4
Senior	49	17.1
Other	9	3.1
Marital status (*n* = 276)		
Never married	273	95.1
Other	3	0.9
Ethnicity (*n* = 249)		
Black, not of Hispanic origin	22	7.7
Hispanic	19	6.6
White, not of Hispanic origin	157	54.7
American Indian or Alaskan Native	1	0.3
Asian or Pacific Islander	36	12.5
Other	14	4.9

There are no significant differences between the groups across demographic variables.

TABLE 2

Psychiatric Symptoms Across Sexes

	Male		Female		*t*-Test
	n	**Mean (SD)**	***n***	**Mean (SD)**	***t***
BDI (minus item 11)	92	18.27 (6.12)	184	18.53 (6.46)	−0.33 (274)
SBQ-R	45	6.89 (3.20)	101	7.02 (3.69)	−0.21 (144)
BHS	34	6.03 (4.37)	61	6.3 (4.01)	−0.30 (93)
Q-LES-Q	50	48.24 (9.16)	81	47.55 (8.91)	0.43 (129)
ASQ intensity	40	69.10 (31.08)	95	71.86 (28.32)	−0.50 (133)
ASQ frequency	39	68.33 (29.22)	94	67.03 (28.52	0.24 (131)
CPFQ	54	21.36 (5.64)	109	21.46 (5.54)	−0.11 (161)

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TABLE 3

Prevalence of Risky Behaviors Across Sexes

	Male	Female	
	n **(%)**	***n*** **(%)**	χ^2
Compulsive drinking	21 (33.3)	20 (17.2)	5.987**
Compulsive illicit drugs	23 (33.3)	20 (17.2)	6.28**
Compulsive prescription drugs	11 (16.4)	6 (5.2)	6.374*
AUDIT ≥8	17 (53.1)	15 (33.3)	3.01

* $p = 0.017$.

** $p < 0.015$.

TABLE 4

Students With Severe Irritability and No/Mild Irritability Across Psychiatric and Functional Outcomes

	Men					Women				
	No/Mild Irritability		Severe Irritability		*t*-Test	No/Mild Irritability		Severe Irritability		*t*-Test
	n	**Mean (SD)**	***n***	**Mean (SD)**	***t***	***n***	**Mean (SD)**	***n***	**Mean (SD)**	***t***
BDI (minus item 11)	71	17.10 (4.99)	17	21.41 (7.85)	2.16 (19.21)*	150	17.63 (5.28)	33	22.30 (9.29)	2.80 (36.70)**
SBQ-R	34	6.71 (3.12)	8	7.13 (4.10)	−0.32 (40)	79	6.91 (3.56)	21	7.62 (4.19)	−0.78 (98)
BHS	30	5.8 (4.24)	4	7.75 (5.68)	−0.83 (32)	53	6.34 (4.10)	8	6.00 (3.63)	0.22 (59)
Q-LES-Q	42	48.52 (8.1)	8	46.75 (14.13)	0.50 (48)	69	48.04 (9.02)	12	44.75 (8.05)	1.18 (79)
ASQ intensity	27	64.19 (32.71)	9	82.67 (29.50)	−1.50 (34)	74	68.07 (27.34)	20	85.60 (28.96)	−2.51(92)***
ASQ frequency	26	62.35 (29.45)	9	81.44 (30.27)	−1.67 (33)	73	62.055 (26.02)	20	84.65 (31.43)	3.29 (91)****
CPFQ	38	20.93 (4.41)	12	22.92 (8.67)	−0.76 (48)	86	20.97 (5.46)	22	23.32 (5.69)	−1.79 (106)

* $p < 0.05$.

** $p = 0.008$.

*** $p = 0.014$.

**** $p = 0.001$.

TABLE 5

Levels of Irritability and Reported Risky Behaviors in the Male and Female Students

	Men					Women				
	No/Mild Irritability	Severe Irritability				No/Mild Irritability	Severe Irritability			
	n (%)	*n* (%)	Wald	EXP(B)	95% CI	*n* (%)	*n* (%)	Wald	EXP(B)	95% CI
Compulsive drinking	13 (25.5)	8 (66.7)	6.52(1)*	5.85	1.51–22.67	16 (16.2)	4 (23.5)	0.55(1)	1.596	0.461–5.53
Compulsive illicit 6 drugs	15 (26.8)	8 (61.5)	5.23(1)**	4.37	1.24–15.48	16 (16.3)	4 (22.2)	0.37(1)	1.464	0.426–5.03
Compulsive prescription drugs	6 (10.9)	5 (41.7)	5.87(1)***	5.83	1.4–24.29	4 (4.1)	2 (10.5)	1.23(1)	2.74	0.464–16.13
AUDIT ≥8	12 (46.2)	5 (83.3)	2.29	5.83	0.59–57.11	12 (33.3)	3 (33.3)	0.00	1.00	0.21–4.71

* $p = 0.011$.

** $p = 0.022$.

*** $p = 0.015$.