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Coprevalence of Anxiety and Depression With Spasmodic Dysphonia: A Case-Control Study

Laura J. White^{*}, Edie R. Hapner^{*}, Adam M. Klein^{*}, John M. Delgaudio^{*}, John J. Hanfelt[†], H. A. Jinnah^{‡,§}, and Michael M. Johns III^{*}

^{*}Department of Otolaryngology, The Emory Voice Center, Emory University, Atlanta, Georgia

[†]Department of Biostatistics, Rollins School of Public Health, Atlanta, Georgia

[‡]Department of Neurology, Emory University, Atlanta, Georgia

[§]Department of Human Genetics, Emory University, Atlanta, Georgia

Summary

Introduction—There is evidence supporting an association between depression and anxiety in patients with chronic disease. Spasmodic dysphonia (SD) is a chronic, incurable, and disabling voice disorder. Reported rates of depression and anxiety in SD range from 7.1% to 72%, with a maximum number of 18 patients. The goal of this study was to define the coprevalence of depression and anxiety with SD.

Materials and Methods—A single-institution case-control study was performed from May to July 2010. Consecutive patients with SD and benign voice disorders were enrolled prospectively. On enrollment, patients were asked to fill out a questionnaire that reviewed the duration of the voice disorder and personal history of anxiety and depression, including current and lifetime diagnosis.

Results—One hundred forty-six controls with benign voice disorders and 128 patients with SD were enrolled. Patients with SD were no more likely to be diagnosed with depression or anxiety than those of the control group (odds ratio [OR] = 0.985, 95% confidence interval [CI] = 0.59–1.63; and OR = 1.314; 95% CI 0.75–2.3, respectively). Additionally, duration of disease was a risk factor for depression in both the SD group and the control group, and the association was not significantly different between groups.

Conclusion—Patients with SD were no more likely to have depression or anxiety than those with other voice disorders. It is important for otolaryngologists to be aware of the increased rates of depression in patients diagnosed with chronic diseases, including voice disorders, and to refer to a psychiatrist when appropriate.

Keywords

Anxiety; Depression; Spasmodic dysphonia

INTRODUCTION

Spasmodic dysphonia (SD) is a rare phonatory disorder of unknown pathogenesis. It is a type of dystonia that affects the laryngeal muscles causing involuntary and sustained muscle contractions. SD is a chronic, incurable, and disabling voice disorder.¹ Patients suffer from voice breaks and a strained/strangled voice. Other actions such as swallowing and singing are often unimpeded. Current treatments provide only temporary relief of symptoms. Approximately 50,000 individuals in North America have SD. However, no reliable validated screening tool exists, so SD is likely underdiagnosed. SD typically presents in the fifth decade of life with a female predominance of 2.6:1.²

SD is a chronic neurological condition for which there is no cure. There is evidence supporting an association between depression and anxiety in patients with chronic disease,^{3–10} including heart disease, osteoporosis,¹¹ and chronic obstructive pulmonary disease.¹² Although the rates of depression and anxiety vary with the type of disease, the lifetime risk of developing depression that necessitates assistance from a health care professional is approximately 20% across all chronic disease,¹³ as compared with approximately 10% in healthy individuals.¹⁴ It has also been shown that the longer a patient endures a chronic disease, the higher the likelihood the person has of developing depression.¹²

Data are limited concerning the rate of comorbid depression and anxiety in patients with SD. In the United States, reported rates of comorbid depression and anxiety in SD range from 7.1% to 72%, with a maximum number of 18 patients.^{15–17} Many of the studies finding an association between psychiatric disease and SD were written when SD was thought to be a psychogenic disorder caused by neurosis. These early articles attempted to prove that stress, depression, and anxiety were the precipitating factors in developing SD, not the consequence of the disease.^{17–20} Although SD has now been proven to be a neurological disease, the coincidence of depression and anxiety cannot be ignored. To date, there are no studies correlating the duration of SD with the prevalence of comorbid depression and anxiety nor are there accurate data of the coprevalence of SD with depression and anxiety.

MATERIALS AND METHODS

The study used a case-control design. Between May and July 2010, 130 consecutive patients with SD and 157 consecutive patients with benign voice disorders were enrolled prospectively from a referral academic laryngology practice. Both new and returning patients were included. Emory University Institutional Review Board approval was obtained. Volunteers signed a written consent form before study participation. All patients were diagnosed with primary SD after a comprehensive speech and voice evaluation, including standard vocal tasks and videolaryngostroboscopy by both a fellowship-trained laryngologist and a speech-language pathologist who specialized in voice disorders and had extensive experience in voice disorder assessment and management.

Exclusion criteria for the patients with benign voice disorders included voice disorder because of malignancy, voice disorder because of a neurological condition, or chief complaint other than voice disorder. Exclusion criteria for the patients with SD included generalized dystonia.

On enrollment, patients were asked to fill out a questionnaire that reviewed the duration of the voice disorder and personal history of anxiety and depression, including current treatment and lifetime diagnosis. Our goal was to look for an association between anxiety and depression in patients with SD as compared with patients with benign voice disorders in a treatment-seeking population from the same clinic.

To compare the two groups, *t* tests for the quantitative outcome variables and Pearson chi-square tests for the binary and categorical variables were used. If any expected table entries were less than 5, then Fisher exact test instead of the Pearson chi-square test was used. All tests were two sided, and *P* values less than 0.05 were regarded as significant.

RESULTS

Two hundred eighty-five patients were enrolled. Of these, 11 patients were excluded, that is, three patients with a diagnosis other than a voice disorder, three patients with generalized dystonia, three patients with a voice disorder secondary to a different neurological condition, one patient with a voice disorder secondary to a malignancy, and one patient with a missing diagnosis. Two hundred seventy-four participants, aged 18–82 years, were included. Of the included patients, 146 were in the control group and 128 were diagnosed with SD (Table 1 for the individual diagnoses within the control group). Ninety-five percent of patients with SD had adductor type, 4% had abductor type, and 1% had atypical SD. Additional clinical and demographic information are contained in Table 2.

An independent samples test indicated that patients with SD (mean = 59.3, standard deviation = ± 12.4) were significantly older than controls (mean 55.0, standard deviation = ± 14.9), $t(272) = 2.60$, $P = 0.009$. Additionally, the duration of illness in patients with SD (mean = 17.4, standard deviation = ± 13.6 years) was significantly longer than that of illness in controls (mean = 7.4, standard deviation = ± 12.7 years), $t(271) = 2.71$, $P = 0.001$ (Table 2).

Chi-square analyses were conducted to determine whether there were significant differences among demographic and clinical categories. Analyses indicated that the proportion of women in the SD group (79%) was significantly higher than that of women in the control group (66%), $P = 0.02$. There was no significant difference in the proportion of patients with depression in the SD group (28%) and the control group (29%), $P > 0.05$. Neither was there a difference in the proportion of patients with anxiety in the SD group (25%) and the control group (19%), $P > 0.05$ (Table 3).

A logistic regression analysis was performed to determine if there was a significant difference in the association between duration of illness and depression in patients with SD and controls. Depression was the outcome, and an interaction effect was entered between SD and controls and duration of disease (coded as a continuous variable). Analysis was adjusted for age and gender. There was no evidence that the association between depression and duration of illness differed between patients with SD and controls, $P = 0.21$ (Table 3).

As there was no significant difference in the association of duration of illness and depression between patients with SD and controls, the groups were combined to determine if there was a significant association between duration of illness and depression in all patients with voice disorders. This was determined using a logistic regression model in which depression was the outcome and duration of disease (coded as a continuous variable) was entered as an explanatory variable. Results were adjusted for age and gender. Analyses indicated that duration of disease was positively associated with depression, $P = 0.05$ (Table 4).

A logistic regression analysis was then performed to determine if there was a significant difference in the association between anxiety and duration of disease in patients with SD and controls. Anxiety was the outcome, and an interaction effect was entered between SD and controls and duration of disease. Analysis was adjusted for age and gender. There was no evidence that the association between anxiety and duration of disease differed between patients with SD and controls, $P = 0.76$ (Table 5).

As there was no significant difference in the association of anxiety and duration of disease between patients with SD and controls, the groups were combined to determine if there was an association between anxiety and duration of illness in all patients with voice disorders. This was determined using a logistic regression model in which anxiety was the outcome and duration of disease (coded as a continuous variable) was entered as an explanatory variable. Results were adjusted for age and gender. There was no evidence of an association between anxiety and duration of disease in patients with voice disorders, $P = 0.99$ (Table 6).

A logistic regression analysis was used to determine if there was a significant difference in the association between anxiety and depression in patients with SD and controls. Depression was the outcome, and an interaction effect was entered between SD and controls and anxiety. Results were adjusted for duration of disease, age, and gender. There was no evidence that the association of anxiety and depression differed between patients with SD and controls, $P = 0.24$ (Table 7).

As there was no significant difference in the association between anxiety and depression in patients with SD and controls, the groups were combined to determine if there was a significant difference an association between anxiety and depression in all patients with voice disorders. This was determined by using a logistic regression model in which depression was the outcome and anxiety was entered as an explanatory variable. Results were adjusted for duration of illness, age, and gender. Analyses demonstrated that there was an association between anxiety and depression in patients with voice disorders, $P < 0.001$ (Table 8).

DISCUSSION

This study demonstrates that patients with SD are no more likely than voice disorder controls to be diagnosed with anxiety or depression. Additionally, the proportion of patients with depression in both the SD and the control groups (28.3% and 28.7%, respectively) is higher than the average rate of depression in the United States (10%) and more closely approximates the average rate of depression in chronic disease (20%). Additionally, the proportion of patients with previously diagnosed anxiety in both the SD and control groups (25.2% and 19.2%, respectively) was higher than the rate of anxiety in the general population (14%).

It has been previously reported in several large studies that duration of chronic disease is associated with the development of depression. In this study, duration of disease was associated with depression in both the control and the SD groups, with no significant difference between groups ($P = 0.21$). Voice disorders are often socially and functionally debilitating, interfering with the basic ability to communicate. Additionally, many voice disorders, including SD, are chronic conditions with no cure and often require long-term follow-up with voice specialists. It is important for otolaryngologists to be aware of the increased risk of developing depression when treating patients with any chronic voice disorder.

The proportion of patients with comorbid anxiety was not significantly higher in the SD group than the control group ($P = 0.25$). This is particularly notable because of the history of SD. Before SD was determined to be a neurological condition, it was thought to be a psychogenic condition precipitated by stress, anxiety, and neurosis.²¹ Additionally, an emotional event can precede the onset of SD, so patients are often thought to have more anxiety than other patients. Our study shows that this is not the case. Additionally, population studies in the United States have shown that approximately 50% of patients with mood disorders have comorbid anxiety disorders.²² This holds true for this study population

as well, as anxiety was positively associated with depression in both patients with SD (50%) and controls (68%), $P < 0.001$.

Population-based studies have shown that depressive and anxiety disorders are negatively associated with age and positively associated with female gender, even when accounting for chronic disease and physical comorbidities.^{12,23} In our study population, there was a significant difference in age between patients with SD (mean = 59, standard deviation = ± 12 years) and controls (mean = 55, standard deviation = ± 15 years), $P = 0.009$. There was also a significant difference in the number of women with SD (79%) compared with voice disorder controls (66%), $P = 0.02$. Therefore, both age and gender were controlled for in all subsequent analyses.

In 2007, a group in Sweden assessed psychiatric comorbidity in patients with SD as compared with those with recurrent respiratory papillomatosis (RRP).²⁴ The investigators administered several questionnaires, checklists, and assessments to diagnose patients with psychiatric conditions. In their study, 35% of patients with SD were diagnosed with depression or a depression variant and 33% were diagnosed with anxiety. This was not statistically different from those with RRP. Similar to the United States, the prevalence of depression in Sweden is 11% and is positively associated with frequent use of health services, anxiety, and female gender and is negatively associated with age.²⁵ In this study, voice disorder patients were considered to have depression and/or anxiety only if they had sought treatment to be diagnosed with depression and/or anxiety, which is likely why the proportion of those with anxiety and depression is lower. Studies such as the Swedish study that are performed with depression and anxiety scales include patients with any level of depression and anxiety, not necessarily severe enough for patients to seek treatment.

It is important for practitioners who diagnose and treat patients with all voice disorders to be aware that depression and anxiety are more common than previously thought and that psychosocial intervention may be appropriate. Thus, it is important for otolaryngologists to assess for depression and anxiety in patients with voice disorders and refer to a psychiatrist when appropriate.

Limitations/future studies

In this study, only voice disorder patients who had previously been diagnosed with depression or anxiety were included in the subcategory of patients with depression or anxiety. These patients represented a treatment-seeking population, which likely represented patients with more severe disease. Therefore, a limitation of this study is that it likely underestimated the rate of comorbid depression and anxiety because only those patients who had previously been diagnosed with depression and anxiety were included. A future study using validated tools to properly assess for depression and anxiety in patients with SD is warranted.

It has been shown that the more serious the somatic disease is, the more probably it will be accompanied by mood and anxiety symptoms.¹² Therefore, a large study that correlates depression and anxiety to symptom severity or frequency of treatment is also warranted. We recommend working with a psychiatrist to develop study design.

CONCLUSION

Patients with SD were no more likely to have depression or anxiety than those with other voice disorders; however, both groups have increased rates of depression and anxiety as compared with the general population. It is important for otolaryngologists to be aware of

the increased rates of depression in patients diagnosed with chronic diseases, including voice disorders, and to refer to psychiatrist when needed.

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REFERENCES

1. Rubin AD, Wodchis WP, Spak C, Kileny PR, Hoikyan ND. Longitudinal effect of Botox injections of voice-related quality of life (V-RQOL) for patients with adductory spasmodic dysphonia. *Arch Otolaryngol Head Neck Surg*. 2004; 130:415–420. [PubMed: 15096423]
2. Adler CH, Edwards BW, Bansberg SF. Female predominance in spasmodic dysphonia. *J Neurol Neurosurg Psychiatry*. 1997; 63:688. [PubMed: 9408119]
3. Wells KB, Golding JM, Burnam MA. Chronic medical conditions in a sample of the general population with anxiety, affective, and substance use disorders. *Am J Psychiatry*. 1989; 146:1440–1446. [PubMed: 2817115]
4. Dew, MA. Psychiatric disorder in the context of physical illness. In: Dohrenwend, BP., editor. *Adversity, Stress, and Psychopathology*. Oxford University Press; New York, NY: 1998. p. 177–218.
5. Katon WJ, Ciechanowski KP. Impact of major depression on chronic medical illness. *J Psychosom Res*. 2002; 53:859–863. [PubMed: 12377294]
6. Harter MC, Conway KP, Merikangas KR. Associations between anxiety disorders and physical illness. *Eur Arch Psychiatry Clin Neurosci*. 2003; 253:313–320. [PubMed: 14714121]
7. McWilliams LA, Cox BJ, Enns MW. Mood and anxiety disorders associated with chronic pain: an examination in a nationally representative sample. *Pain*. 2003; 106:127–133. [PubMed: 14581119]
8. Buist-Bouwman MA, De Graaf R, Vollebergh WAM, Ormel J. Comorbidity of physical and mental disorders and the effect on work-loss days. *Acta Psychiatrica Scandinavica*. 2005; 111:436–443. [PubMed: 15877710]
9. Simon GE, Nov Korff M, Saunders K, et al. Association between obesity and psychiatric disorders in the US adult population. *Arch Gen Psychiatry*. 2006; 63:1–7.
10. Ortega AN, Feldman JN, Canino G, Steinman K, Alegría M. Co-occurrence of mental and physical illness in US Latinos. *Soc Psychiatry Psychiatr Epidemiol*. 2006; 41:927–934. [PubMed: 17013767]
11. Clarke DM, Currie KC. Depression, anxiety and their relationship with chronic diseases: a review of the epidemiology, risk, and treatment evidence. *Med J Aust*. 2009; 190:54–60. [PubMed: 19236287]
12. Moussas G, Tselebis A, Karkanias A, et al. A comparative study of anxiety and depression in patients with bronchial asthma, COPD, and tuberculosis in a general hospital of chest diseases. *Ann Gen Psychiatry*. 2008; 7:7–11. [PubMed: 18495038]
13. Wells KB, Golding J, Burnam MA. Psychiatric disorder in a sample of the general population with and without chronic medical conditions. *Am J Psychiatry*. 1998; 145:976–979. [PubMed: 2969199]
14. Cassem, NG.; Stern, TA.; Rosenbaum, JF., et al. Depressed patients. In: Stern, TA.; Friccione, GL., et al., editors. *Massachusetts General Hospital Handbook of General Hospital Psychiatry*. 5th ed. Mosby/Elsevier; Philadelphia, PA: 2004. p. 25–68.

15. Liu CY, Yi JM, Wang NM, et al. Emotional symptoms are secondary to the voice disorder in patients with spasmodic dysphonia. *Gen Hosp Psychiatry*. 1998; 20:255–259. [PubMed: 9719906]
16. Mirza N, Ruiz C, Baum ED, Staab JP. The prevalence of major psychiatric pathologies in patients with voice disorders. *Ear Nose Throat J*. 2003; 82:808–810. [PubMed: 14606179]
17. Aronson AE, Brown JR, Litin EM, Pearson JS. Spastic dysphonia. II. Comparison with essential (voice) tremor and other neurologic and psychogenic dysphonias. *J Speech Hear Disord*. 1968; 33:219–231. [PubMed: 5668051]
18. Moses, PJ. *The Voice of Neurosis*. Grune and Stratton; New York, NY: 1954.
19. Aronson AE, Peterson HW, Litin EM. Psychiatric symptomatology in functional dysphonia and aphonia. *J Speech Hear Disord*. 1966; 31:115–127. [PubMed: 4379941]
20. Block P. Neuro-psychiatric aspects of spastic dysphonia. *Folia Phoniatr*. 1956; 17:301–364.
21. Brodnitz FS. Spastic dysphonia. *Ann Otol Rhinol Laryngol*. 1976; 85(2 Pt1):210–214. [PubMed: 1267325]
22. Kessler RC, Nelson CV, McGonagle KA, et al. Comorbidity of DSM-III-R major depressive disorder in the general population: results from the US national comorbidity survey. *Br J Psychiatry*. 1996; 168(suppl 30):17–30.
23. Scott KM, Von Korff M, Alonso M, et al. Age patterns in the prevalence of DSM-IV depressive/anxiety disorders with and without physical comorbidity. *Psychol Med*. 2008; 38:1659–1669. [PubMed: 18485262]
24. Gundel H, Busch R, Ceballos-Baumann A, et al. Psychiatric comorbidity in patients with spasmodic dysphonia: a controlled study. *J Neurol Neurosurg Psychiatry*. 2007; 78:1398–1400. [PubMed: 17615166]
25. Martin-Merino E, Ruigomez A, Johansson S, Wallander MA, Garcia-Rodriguez LA. Study of a cohort of patients newly diagnosed with depression in general practice: prevalence, incidence, comorbidity, and treatment patterns. *Prim Care Companion J Clin Psychiatry*. 2010; 12:764.

TABLE 1
Individual Diagnoses and Percentage With Depression and Anxiety (n) Within the Control Group

Diagnosis Within the Benign Voice Disorders Control Group	n	Patients With Anxiety, % (n)	Patients With Depression, % (n)
Laryngitis	10	20 (2)	50 (5)
Allergies	1	0 (0)	0 (0)
Vocal fold keratosis	2	50 (1)	50 (1)
Vocal fold dysplasia	1	0 (0)	100 (1)
Vocal fold atrophy	6	0 (0)	50 (3)
Vocal fold cyst	3	33 (1)	0 (0)
Vocal fold granuloma	4	0 (0)	0 (0)
Vocal fold nodules	2	0 (0)	100 (2)
Vocal fold paralysis	45	15 (7)	29 (13)
Vocal fold paresis	5	0 (0)	0 (0)
Vocal fold polyp	7	29 (2)	29 (2)
Vocal fold scarring	3	0 (0)	33 (1)
Vocal fold hemorrhage	1	0 (0)	0 (0)
Glottic scar	2	50 (1)	50 (1)
Glottic stenosis	1	0 (0)	0 (0)
Laryngopharyngeal reflux	3	0 (0)	33 (1)
Laryngeal papillomatosis	8	13 (1)	13 (1)
Laryngeal sarcoidosis	2	0 (0)	0 (0)
Laryngeal edema	1	0 (0)	0 (0)
Laryngeal spasm	3	33 (1)	66 (2)
Laryngospasm	1	100 (1)	0 (0)
Muscle tension dysphonia	14	29 (4)	36 (5)
Paradoxical vocal fold movement	3	33 (1)	66 (2)
Phonotrauma	4	50 (2)	25 (1)
Postintubation phonatory insufficiency	2	50 (1)	50 (1)
Reinke's edema	1	0 (0)	0 (0)
Sulcus vocalis	1	0 (0)	0 (0)
Chronic cough	1	0 (0)	0 (0)

Diagnosis Within the Benign Voice Disorders Control Group	n	Patients With Anxiety, % (n)	Patients With Depression, % (n)
Dysfluency	1	100 (1)	100 (1)
Dysphonia	2	0 (0)	0 (0)

TABLE 2**Clinical and Demographic Characteristics**

Characteristic	Controls (n = 146)	SD (n = 128)	P Value
Gender			
Female	96 (66)	101 (79)	0.02
Male	50 (34)	27 (21)	
Race			
White/Caucasian	102 (70)	103 (80)	0.13
Black/African American	36 (25)	20 (16)	
Other	8 (5)	5 (4)	
Age, y	55.0 ± 14.9	59.3 ± 12.4	0.009
Duration of disease, y	7.4 ± 12.7	17.4 ± 13.6	<0.001
Depression	42 (29)	36 (28)	0.91
Anxiety	28 (19)	32 (25)	0.25
Depression and/or anxiety	51 (35)	52 (41)	0.33

Values are represented as mean ± standard deviation or frequency (%).

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TABLE 3
Relationship Between Depression and Duration of Disease in SD Patients and Controls

Duration of Disease, y	Proportion of Patients Who Are Depressed		Test of Whether the Association Between Depression and Duration of Disease Differed Between SD Patients and Controls *
	Controls	SD	
<5	24/105 (23%)	2/18 (11%)	P = 0.21
5–10	5/10 (50%)	6/26 (23%)	
>10	13/31 (42%)	28/83 (34%)	

* Based on a logistic regression model in which depression was the outcome and an interaction effect was entered between SD and duration of disease (coded as a continuous variable). Results were adjusted for age and gender.

TABLE 4

Relationship Between Depression and Duration of Disease, Where the SD Group and Controls are Pooled

Duration of Disease, y	Not Depressed, n (%)	Depressed, n (%)	Test of Association Between Depression and Duration of Disease [*]
<5 (n = 123)	97 (79)	26 (21)	$P = 0.05$
5–10 (n = 36)	25 (69)	11 (31)	
>10 (n = 114)	73 (64)	41 (36)	

^{*} Based on a logistic regression model in which depression was the outcome and duration of disease (coded as a continuous variable) was entered as an explanatory variable. Results were adjusted for age and gender.

TABLE 5
Relationship Between Anxiety and Duration of Disease in SD Patients and Controls

Duration of Disease, y	Proportion of Patients With Anxiety		Test of Whether the Association Between Anxiety and Duration of Disease Differed Between SD Patients and Controls *
	Controls	SD	
<5	20/105 (19%)	5/18 (28%)	$P = 0.76$
5–10	2/10 (20%)	9/26 (35%)	
>10	6/31 (19%)	18/83 (22%)	

* Based on a logistic regression model in which anxiety was the outcome and an interaction effect was entered between SD and duration of disease (coded as a continuous variable). Results were adjusted for age and gender.

TABLE 6

Relationship Between Anxiety and Duration of Disease, Where the SD Group and Controls are Pooled

Duration of Disease, y	Not Anxious, n (%)	Anxious, n (%)	Test of Association Between Anxiety and Duration of Disease*
<5 (n = 123)	98 (80)	25 (20)	$P = 0.99$
5–10 (n = 36)	25 (69)	11 (31)	
>10 (n = 114)	90 (79)	24 (21)	

* Based on a logistic regression model in which anxiety was the outcome and duration of disease (coded as a continuous variable) was entered as an explanatory variable. Results were adjusted for age and gender.

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TABLE 7

Relationship Between Depression and Anxiety in SD Patients and Controls

Anxiety	Proportion of Patients Who Are Depressed		Test of Whether the Association Between Depression and Anxiety Differed Between SD Patients and Controls*
	Controls	SD	
Yes	19/28 (68%)	16/32 (50%)	$P = 0.24$
No	23/118 (19%)	20/96 (21%)	

* Based on a logistic regression model in which depression was the outcome and an interaction effect was entered between SD and anxiety. Results were adjusted for duration of disease, age, and gender.

TABLE 8

Relationship Between Depression and Anxiety, Where the SD Group and Controls are Pooled

Anxiety	Not Depressed, n (%)	Depressed, n (%)	Test of Association Between Depression and Anxiety*
Yes (n = 60)	25 (42)	35 (58)	$P < 0.001$
No (n = 214)	171 (80)	43 (20)	

* Based on a logistic regression model in which depression was the outcome and anxiety was entered as an explanatory variable. Results were adjusted for duration of disease, age, and gender.