

Obsessive-Compulsiveness in a Population of Tinnitus Patients

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Abstract: The purpose of this study was to use the Maudsley Obsessional-Compulsive Inventory (MOCI) to assess obsessive-compulsiveness in a population of 196 tinnitus patients and to correlate MOCI scores with measures of anxiety, depression, and tinnitus severity. Tinnitus severity was positively correlated with measures of anxiety and depression. Depression was positively correlated with MOCI and anxiety scores. MOCI scores exhibited weaker positive correlations with tinnitus severity and anxiety. Effective management of tinnitus requires identification of psychological disorders or symptoms when they are present so that patients can receive appropriate treatment as soon as possible. The MOCI can be used to assess obsessive-compulsiveness in tinnitus patients.

Key Words: anxiety; compulsive; depression; Maudsley; obsessive; tinnitus

Obsessive-compulsive disorder (OCD) is a syndrome characterized by obsessions or compulsions (or both) that last at least 1 hour per day and interfere with one's normal social or occupational functioning [1]. Obsessions are expressed internally and subjectively by patients as thoughts, impulses, or images. According to the *Diagnostic and Statistical Manual of Mental Disorders* (DSM), 4th edition [2], obsessions are intrusive and cause marked anxiety and distress. Categories of obsessions include contamination, aggression, religion, safety or harm, exactness or symmetry, and somatic or body fears. Compulsions are repetitive behaviors or purposeful mental acts that are performed to prevent distress or a dreaded event. Compulsions can include checking, cleaning or washing, counting, repeating, ordering or arranging, and hoarding or collecting [3].

Even if they do not fulfill the DSM criteria for diagnosis of OCD, many patients with severe tinnitus exhibit obsessive thoughts or compulsive behaviors related to

their auditory symptoms. These patients are often preoccupied with or anxious about personal health issues to the point of hypochondriasis [4] or somatization [5]. Hypochondriasis can be considered an "OCD spectrum disorder" [6]. Some patients also exhibit compulsions, such as repeatedly checking the status of their tinnitus or environmental sound levels. These obsessive-compulsive tendencies are counterproductive to the tinnitus habituation process.

Previous studies investigated associations between tinnitus and psychological factors, such as depression [7] and anxiety [8]. However, few studies of tinnitus patients assessed obsessive-compulsiveness in this population. Stephens and Hallam [9] administered the Crown-Crisp Experimental Index (CCEI) to 472 tinnitus patients participating in a multicenter study. As compared to Crown-Crisp normative data, tinnitus patients scored significantly higher on anxiety, obsessiveness, and depression subscales of the CCEI. McKee and Stephens [10] used the CCEI to compare tinnitus patients with a similar number of control subjects who did not hear tinnitus. Tinnitus patients scored significantly higher than did control subjects on CCEI anxiety and obsessiveness subscales.

Our study used the Maudsley Obsessional-Compulsive Inventory (MOCI) [11] to assess obsessive-compulsiveness of patients who were evaluated in the Tinnitus

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This study was presented at the Eighth International Tinnitus Seminar in Pau, France, September 8, 2005.

Clinic at Oregon Health and Science University (OHSU). The MOCI was selected as the assessment instrument for the following reasons: (1) It is a patient-administered questionnaire, (2) its validity has been verified in numerous studies [12,13], and (3) it is easy to administer and to score because it consists of 30 statements that patients rate as either true or false. Aims of this study were twofold: to use the MOCI to assess obsessive-compulsiveness in a population of tinnitus patients and to correlate MOCI assessments of obsessive-compulsiveness with measures of anxiety, depression, and tinnitus severity.

METHODS

Detailed questionnaires were completed by 200 consecutive patients before their initial appointment at the OHSU Tinnitus Clinic. All the patients experienced and sought treatment for chronic tinnitus. The questionnaires requested information about patients' medical, hearing, and tinnitus histories. Included were 12 questions that comprise the Tinnitus Severity Index (TSI) [8], an efficient indicator of the negative impacts of tinnitus on patients. The MOCI [11], the State Anxiety Inventory (SAI) [14], and an abbreviated version of the Beck Depression Inventory (aBDI) [15] were also completed by patients. Patients rated the loudness of their usual tinnitus on a 1–10 scale and also matched the pitch and loudness of their tinnitus to sounds played through headphones.

Data relating to patient demographics, matched and self-rated tinnitus loudness, TSI, MOCI, SAI, and aBDI scores were analyzed using the Pearson correlation, analyses of variance, and two-tailed *t*-tests.

These protocols were reviewed and approved by the Institutional Review Board at OHSU. Before their participation in this study, patients supplied informed consent in writing.

RESULTS

Data from 196 tinnitus patients (134 male, 62 female; mean age, 52.1 ± 12.8 years; age range, 21–85 years) were analyzed. Table 1 contains mean scores from the MOCI (possible range, 0–30); the SAI (possible range, 20–80); the aBDI (possible range, 0–39); the TSI (possible range, 12–60); and matched and self-rated tinnitus loudness values for all the patients in the study. At the time of their initial appointment in the clinic, patients had perceived tinnitus for an average of 7.1 ± 10.5 years.

According to Beck and Beck [15], a score of 0–4 on the aBDI indicates no or minimal depression; 5–7 indicates mild depression; 8–15 indicates moderate depression; and a score of 16 or higher indicates severe depression. In our study, 100 patients (51%) scored 0–4; 44 patients

Table 1. Means and Standard Deviations for 196 Tinnitus Patients

Age (years)	52.1 ± 12.8
Tinnitus duration (years)	7.1 ± 10.5
Self-rated tinnitus loudness (1–10 scale)	7.1 ± 1.7
Matched tinnitus loudness (dB SL)	8.8 ± 9.6
Maudsley Obsessional-Compulsive Inventory	5.0 ± 4.2
Tinnitus Severity Index	40.4 ± 9.9
Abbreviated Beck Depression Inventory	5.8 ± 5.8
State Anxiety Inventory	39.2 ± 16.9

SL = sensation level.

(22%) scored 5–7; 34 patients (17%) scored 8–15; and 18 patients (9%) scored 16 or higher on the aBDI.

Table 2 contains Pearson correlation coefficients and two-tailed *p* values that resulted from statistical analyses of these measures. Tinnitus severity was highly correlated with SAI and aBDI scores; aBDI scores were positively correlated with MOCI and SAI scores. MOCI scores exhibited weaker positive correlations with TSI and SAI scores.

Patients were then divided into two groups on the basis of MOCI scores: Group 1 consisted of 156 patients (109 male, 47 female) who scored 0–8 on the MOCI; group 2 consisted of 40 patients (25 male, 15 female) who scored 9 or higher on the MOCI. Nine was chosen as the MOCI score criterion for increased obsessive-compulsiveness because this value is one standard deviation greater than the mean MOCI score for the entire group of patients (see Table 1). Table 3 contains statistical comparisons of these two groups of patients. No significant difference between the groups as regards age, tinnitus duration, or self-rated tinnitus loudness was found. However, the group of 40 patients who scored 9 or more on the MOCI exhibited significantly higher values for matched tinnitus loudness, MOCI, TSI, aBDI, and SAI scores as compared to the other group of 156 patients.

DISCUSSION

The mean MOCI score (5.0 ± 4.2) for the entire group of 196 patients in this study was similar to MOCI scores reported for groups of non-tinnitus, non-OCD patients

Table 2. Pearson Correlation Coefficients

	aBDI	SAI	TSI
MOCI	0.49**	0.27*	0.28*
aBDI	—	0.56**	0.56**
SAI	0.56**	—	0.57**

MOCI = Maudsley Obsessional-Compulsive Inventory; aBDI = abbreviated Beck Depression Inventory; SAI = State Anxiety Inventory; TSI = Tinnitus Severity Index.

*Two-tailed *p* < .01.

**Two-tailed *p* < .001.

Table 3. Comparisons Between Two Groups of Patients with Low Versus High MOCI Scores

	MOCI Score of 0–8 (n = 156)	MOCI Score of 9+ (n = 40)	Two- Tailed p Value
Age (yr)	52.2 ± 12.8	51.6 ± 12.8	NS
Tinnitus duration (yr)	6.7 ± 10.2	8.6 ± 11.6	NS
Self-rated tinnitus			
loudness (1–10 scale)	7.0 ± 1.7	7.8 ± 1.8	NS
Matched tinnitus			
loudness (dB SL)	7.7 ± 7.9	13.2 ± 16.1	<.005
MOCI	3.3 ± 4.5	11.9 ± 2.8	<.0001
TSI	38.8 ± 10.1	46.8 ± 9.0	<.0001
aBDI	4.6 ± 5.6	10.7 ± 6.7	<.0001
SAI	35.5 ± 17.6	53.3 ± 14.5	<.0001

aBDI = abbreviated Beck Depression Inventory; MOCI = Maudsley Obsessional-Compulsive Inventory; NS = not significant; SAI = State Anxiety Inventory; SL = sensation level; TSI = Tinnitus Severity Index.

in two previous studies [12,16]. However, MOCI scores of tinnitus patients in this study were positively correlated with their SAI, aBDI, and TSI scores.

Obsessive-Compulsiveness and Anxiety

Because OCD is a type of anxiety disorder, it is not surprising that MOCI scores were positively correlated with SAI scores. The relationship between obsessive-compulsiveness and general anxiety was particularly evident in the group of 40 patients who scored 9 or higher on the MOCI. The mean SAI score (53.3 ± 14.5) for this group was more than one standard deviation higher than the mean SAI score (35.5 ± 17.6) for the group of 156 patients who scored 0–8 on the MOCI. According to data reported by Spielberger et al. [14], the mean SAI score for normal, working adults was 35.6 ± 10.5 . SAI scores of 50 or higher indicate severe anxiety.

A positive correlation between MOCI and SAI scores was also observed by Overbeek et al. [17] in a group of 120 OCD patients. In their study, OCD patients who also experienced depression ($n = 44$) scored 18.7 ± 6.6 on the MOCI and 61.5 ± 11.5 on the SAI. OCD patients without depression ($n = 76$) scored 18.6 ± 6.0 on the MOCI and 51.2 ± 13.7 on the SAI.

Obsessive-Compulsiveness and Depression

In our study, MOCI scores had a stronger correlation with aBDI scores ($r = 0.49$) than with SAI ($r = 0.27$) or TSI scores ($r = 0.28$). According to aBDI criteria, 96 patients (49%) exhibited some degree of depression; 52 patients (27%) exhibited moderate or severe depression. The prevalence of depression among patients in this study was similar to that reported in previous studies of our tinnitus

clinic population [7,18]. Furthermore, tinnitus patients who scored 9 or more on the MOCI scored significantly higher on the aBDI than did patients who scored 0–8 on the MOCI. Richter et al. [19] reported a positive correlation between obsessive-compulsiveness and depression in a group of non-tinnitus OCD patients.

Harrop-Griffiths et al. [20] reported that tinnitus patients with current depression scored significantly higher than did nondepressed tinnitus patients on Symptoms Checklist 90 subscales of obsessive-compulsiveness and anxiety. Because depression is often concurrent with obsessive-compulsiveness, Richter et al. [19] recommended formal assessment of both conditions when either one is present.

Obsessive-Compulsiveness and Tinnitus Severity

Though the correlation between MOCI and TSI scores in this study was moderate ($r = 0.28$), patients who scored 9 or more on the MOCI scored significantly higher on the TSI than did patients who scored 0–8 on the MOCI. The group of 40 patients who scored 9 or higher on the MOCI also matched their tinnitus to significantly louder sounds (13.2 ± 16.1 dB sensation level [SL]) than did patients who scored 0–8 on the MOCI (7.7 ± 7.9 dB SL). Possibly louder tinnitus contributed to higher TSI, aBDI, and SAI scores for patients who scored 9 or more on the MOCI. However, previous studies reported that the matched loudness of tinnitus was not correlated with measures of the symptom's severity [21], aBDI, or SAI scores [8].

Tinnitus severity is often correlated with the degree of patients' depression [7] and anxiety [8]. Our study showed that tinnitus severity was positively correlated with obsessive-compulsiveness. According to Hiller and Goebel [22], "Chronic tinnitus often fails to respond to somatic treatment, and the continuous annoyance due to the noises may then lead to a widespread and severe psychological distress and interfere with social and occupational functioning. An adequate treatment of chronic tinnitus thus requires an objective, reliable and comprehensive assessment of psychological problems which have emerged or deteriorated during the course of the disturbance."

Self-administered questionnaires, such as the aBDI, SAI, and MOCI, can be used to assess the presence and severity of depression, anxiety, and obsessive-compulsiveness in tinnitus patients. Patients can also be referred to psychiatrists or psychologists for evaluation if any of these conditions are suspected or recognized. Regardless of the method used, identifying psychological disorders when they are present is imperative so that patients can receive appropriate treatment as soon as possible.

If patients experience tinnitus, anxiety, depression, and obsessive-compulsiveness, these conditions can form a vicious circle and exacerbate one another. Tinnitus is not always the starting point of this cycle; it can begin at any point and progress in any direction. In most cases, patients experienced some degree of anxiety, depression, or obsessive-compulsiveness before their tinnitus began. However, tinnitus can increase the severity of existing psychological disorders or tendencies.

Improvement in obsessive-compulsiveness has been achieved by patients through the use of selective serotonin reuptake inhibitor (SSRI) medications [23], cognitive-behavioral therapy [24], or both these treatment strategies employed simultaneously. Depression and general anxiety disorders can also be treated with SSRI medications and psychotherapy. Cognitive-behavioral therapy has been used successfully to decrease the severity of tinnitus [25]. These overlaps in treatment strategies can be advantageous. When tinnitus patients also experience depression, anxiety, or obsessive-compulsiveness, medication or psychotherapy or both should be used to treat these concurrent conditions. Sustained improvements in psychological symptoms can contribute to long-term reductions in tinnitus severity [18].

CONCLUSIONS

Effective management of tinnitus requires identification of psychological disorders or symptoms when they are present, so that patients can receive appropriate treatment as soon as possible. The MOCI can be used to assess obsessive-compulsiveness in tinnitus patients.

REFERENCES

- Micallef J, Blin O. Neurobiology and clinical pharmacology of obsessive-compulsive disorder. *Clin Neuropharmacol* 24(4):191–207, 2001.
- Diagnostic and Statistical Manual of Mental Disorders IV*. Arlington, VA: American Psychiatric Publishing, Inc, 2000.
- Stahl S. *Essential Psychopharmacology: Neuroscientific Basis and Practical Applications*. Cambridge University Press, 1997:217–233.
- Marciano E, Carrabba L, Giannini P, et al. Psychiatric comorbidity in a population of outpatients affected by tinnitus. *Int J Audiol* 42(1):4–9, 2003.
- Hiller W, Janca A, Burke KC. Association between tinnitus and somatoform disorders. *J Psychosom Res* 43(6):613–624, 1997.
- Hollander E. Obsessive-compulsive spectrum disorders: An overview. *Psychiatr Ann* 23(7):355–358, 1993.
- Folmer RL, Griest SE, Meikle MB, Martin WH. Tinnitus severity, loudness and depression. *Otolaryngol Head Neck Surg* 121:48–51, 1999.
- Folmer RL, Griest SE, Martin WH. Chronic tinnitus as phantom auditory pain. *Otolaryngol Head Neck Surg* 124(4):394–400, 2001.
- Stephens SDG, Hallam RS. The Crown-Crisp Experimental Index in patients complaining of tinnitus. *Br J Audiol* 19:151–158, 1985.
- McKee GJ, Stephens SDG. An investigation of normally hearing subjects with tinnitus. *Audiology* 31:313–317, 1992.
- Rachman SJ, Hodgson RJ. *Obsessions and Compulsions*. Englewood Cliffs, NJ: Prentice-Hall, Inc, 1980.
- Sternberger LG, Burns GL. Maudsley obsessional-compulsive inventory: Obsessions and compulsions in a non-clinical sample. *Behav Res Ther* 28(4):337–340, 1990.
- Emmelkamp PM, Kraaijkamp HJ, van den Hout MA. Assessment of obsessive-compulsive disorder. *Behav Modif* 23(2):269–279, 1999.
- Spielberger CD, Gorsuch RL, Lushene R, et al. *STAIS-AD Manual*. Palo Alto, CA: Consulting Psychologists Press, Inc, 1983.
- Beck AT, Beck RW. Screening depressed patients in family practice: A rapid technic. *Postgrad Med* 52(6):81–85, 1972.
- Støylen IJ, Larsen S, Kvale G. The Maudsley obsessional-compulsive inventory and OCD in a Norwegian nonclinical sample. *Scand J Psychol* 41:283–286, 2000.
- Overbeek T, Schruers K, Vermetten E, Griez E. Comorbidity of obsessive-compulsive disorder and depression: Prevalence, symptom severity, and treatment effect. *J Clin Psychiatry* 63(12):1106–1112, 2002.
- Folmer RL. Long-term reductions in tinnitus severity. *BMC Ear Nose Throat Disord* 2(3):2002. Available at <http://www.biomedcentral.com/1472-6815/2/3>.
- Richter MA, Cox BJ, Drenfeld DM. A comparison of three assessment instruments for obsessive-compulsive symptoms. *J Behav Ther Exp Psychiatry* 25(2):143–147, 1994.
- Harrop-Griffiths J, Katon W, Dobie R, et al. Chronic tinnitus: Association with psychiatric diagnosis. *J Psychosom Res* 31(5):613–621, 1987.
- Meikle MB, Vernon J, Johnson RM. The perceived severity of tinnitus. *Otolaryngol Head Neck Surg* 92(6):689–696, 1984.
- Hiller W, Goebel G. A psychometric study of complaints in chronic tinnitus. *J Psychom Res* 36(4):337–348, 1992.
- Hollander E. Treatment of obsessive-compulsive spectrum disorders with SSRIs. *Br J Psychiatry* 173(Suppl 35):7–12, 1998.
- Volpato Cordioli A, Heldt E, Braga Bochi D, et al. Cognitive-behavioral group therapy in obsessive-compulsive disorder: A randomized clinical trial. *Psychother Psychosom* 72(4):211–216, 2003.
- Andersson G, Vretblad P, Larsen HC, Lyttkens L. Longitudinal follow-up of tinnitus complaints. *Arch Otolaryngol Head Neck Surg* 127:175–179, 2001.