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Idiopathic intracranial hypertension

Relationship to depression, anxiety, and quality of life

Julia J. Kleinschmidt, PhD, LCSW; Kathleen B. Digre, MD; and Rita Hanover, PhD

Article abstract—*Objective:* To explore the incidence of depression and anxiety and to measure quality of life in women with idiopathic intracranial hypertension (IIH), a matched group cross-sectional study was conducted. Women with IIH (n = 28) were compared with control groups of weight- and age-matched women not diagnosed with IIH (n = 30) and with age-matched women of normal weight (n = 30). *Methods:* Eighty-eight women completed a questionnaire soliciting health information and standardized questionnaires measuring depression, anxiety, and quality of life. The groups were compared using analysis of variance and χ^2 tests. Where appropriate, post hoc comparisons were made using Fisher's test. *Results:* Patients with IIH reported a greater number of adverse health problems than either of the control groups. Non-health-related psychosocial concerns were equally prevalent among the three groups, but IIH patients were significantly more affected by hardships associated with health problems than the other two groups. The patient group also had higher levels of depression and anxiety than the control groups. These adverse health conditions were reflected in decreased quality of life measures for the IIH patients. *Conclusions:* This study supports previous reports that link obesity and psychosocial difficulties, but obesity alone is not the explanation for the higher levels of depression and lower levels of quality of life. **Key words:** Idiopathic intracranial hypertension—Pseudotumor cerebri—Depression—Anxiety—Quality of life—Vision loss—Headache—Obesity—Papilledema.

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Idiopathic intracranial hypertension (IIH) is a condition of increased intracranial pressure without localizing signs except for papilledema with normal intracranial contents and normal CSF constituents. It is seen more frequently in women than men (8:1)^{1,2}; women are of childbearing age, and 90% of IIH patients are obese.³ The most common symptoms are visual obscuration and headache.⁴ The headaches present in at least 90% of patients⁴ are frequently refractory to treatment.⁵ Other symptoms include subjective pulsatile tinnitus, shoulder and arm pain, and incoordination.⁴ Cognition is usually normal.⁶

Papilledema is present in almost all IIH patients and can lead to decreased vision and blindness; one third in a large series had substantial visual loss including loss of visual field.^{7,8}

Treatment has been directed toward preserving vision. Medications that reduce intracranial pressure such as diuretics like acetazolamide and furosemide have some success.⁸ When vision is threatened, these

individuals may undergo optic nerve sheath decompression^{9,10} or lumbar peritoneal shunts^{11,12} to preserve vision. Even with prompt intervention, visual loss can occur.¹⁰

Although the accurate diagnosis and appropriate treatment of IIH are receiving increasing research attention, the psychosocial impact of this condition has not been studied systematically. We studied the psychosocial impact of IIH and compared levels of depression, anxiety, and quality of life measures in women diagnosed with IIH with a control group of women who were not experiencing the symptomatology of IIH but matched the IIH women on age and weight, and a control group of age-matched women of normal weight without IIH.

Methods. *Study design and subjects.* Data for this study were obtained from questionnaires completed by subjects (n = 88). All patients with IIH (n = 28) were patients at the John A. Moran Eye Center, the University

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of Utah in Salt Lake City. Patients with IIH were recruited as follows:

1. Introductory letters, Institutional Review Board (IRB) consent forms, and questionnaires that had been compiled for the purposes of disseminating an IIH informational newsletter and announcing support group meetings were sent to a list of 62 IIH patients. The letter described the study and encouraged participation by all, not just those considerably affected by the condition ("We very much need your input . . . no matter how much or how little you are being affected by it. We need to find out the range of impact that it has on people's lives.") Twenty completed packets were returned, for a response rate of 32%.
2. Seven of the 28 patients (25%) signed IRB consent forms and completed questionnaires at an IIH support group meeting.
3. One patient had begun treatment elsewhere and completed her packet at the time of admission to the Moran Eye Center clinic. Patient charts were reviewed by a neuro-ophthalmologist to assure that all patients met the modified Dandy Criteria for IIH⁸—namely, that all patients had papilledema, normal imaging studies, and elevated opening pressure on CSF examination, with normal CSF constituents.

Controls not diagnosed with IIH, but matched by age and weight to the IIH group, were recruited using flyers distributed around the University of Utah's Health Sciences Center. A small compensation (\$10) was offered for participation. Interested participants were asked to telephone the study center to ascertain age and weight eligibility and, if appropriate, were given appointments to sign the IRB consent form and complete the questionnaires.

Non-IIH, normal weight controls ($n = 30$) were recruited at the University of Utah's Health Sciences Center. They were matched by age to the IIH group, and their "normal weight" was determined using Body Mass Index (BMI) tables.¹³ BMI = weight (kilograms)/height (meters).² All patients in this group had heights and weights that classified them into the "acceptable weight" range.¹³

Measures. Four measures, one written for this study and three standardized measures, were used.

A checklist history questionnaire was created using "yes" and "no" and listing questions to elicit general information on demographics, general health, medications, hardships currently experienced, and coping. The questionnaire completed by IIH patients contained questions specific to IIH, whereas the controls completed questionnaires with similar questions, but that did not include specific questions regarding IIH.

Depression was measured using the Beck Depression Inventory (BDI),¹⁴ a widely used instrument for assessing the intensity of depression. The BDI is a 21-item instrument that consolidates 21 symptoms and attitudes associated with depression. The questions are rated on a 4-point scale so that scores range from 0 to 63. Scoring guidelines classify ranges as: 0 to 9 = minimal depression; 10 to 16 = mild depression; 17 to 29 = moderate depression; and 30 to 63 = severe depression.

In addition to querying about anxiety in the general questionnaire, anxiety was measured using the Spielberger State-Trait Anxiety Inventory (STAI),¹⁵ an instrument widely used in clinical practice and in research. The

STAI is a 40-item instrument that measures both state anxiety, feelings of fear, or worry felt at the time of the testing (20 items) and trait anxiety, the more stable generally experienced feelings of fear or worry (20 items). The 20 items are rated on a 4-point intensity scale from 1 to 4, from "not at all" to "very much so" for state anxiety, and from "almost never" to "almost always" for trait anxiety. Anxiety scores can range from a minimum of 40 to a maximum of 80. Extensive data for normative samples have been collected, and reported mean scores for working-age women are 34.79 (SD, 9.22) for trait anxiety and 35.20 (SD, 10.61) for state anxiety.¹⁵

Quality of life was measured using the SF-36 Health Survey,¹⁶ a psychometrically sound instrument developed during the Medical Outcomes Study¹⁷ and widely used in assessing physical health as it contributes to overall quality of life. The SF-36 measures the impact of health on functioning across eight concepts: physical functioning (the extent to which health limits physical activities); role functioning (the extent to which health limits work and daily activities); bodily pain; general health (as perceived by the individual); vitality (energy and pep); social functioning (the extent to which health interferes with social activities); role functioning—emotional (the extent to which emotional health interferes with daily functioning); and mental health. Scores are derived from Likert scale responses to the 36 items, with higher scores suggesting more positive quality of life. A single-item measure of perceived health change is also included but is not used to score any of the eight multi-item scales.

Analyses. Data elicited from the general checklist questionnaires were tabulated to yield frequency distributions. Tests of association were used to determine whether patterns of symptoms associated with IIH were different from patterns associated with obesity. Data derived from the three standardized questionnaires completed by the three groups were compared using analysis of variance (ANOVA) and χ^2 tests. Post hoc ANOVAs were done after eliminating the four IIH patients with notable self-reported concurrent illnesses, including chronic fatigue syndrome, postpolio, and mononucleosis, to test for the influence of those illnesses. Post hoc Scheffé F tests were conducted for pairwise comparisons.

Results. Demographics. The three groups were equated for age, and the IIH patient group and weight-matched control group were equated for BMI. The normal weight controls reported more years of education than the IIH patients but did not differ from the weight-matched controls (table 1). The three groups did not differ with regard to marital status ($\chi^2 = 6.11$; $p = 0.416$). Of the 88 patients in the study, 38.6% (34/88) were single, 52.2% (46/88) were married, 7.8% (7/88) were divorced, and 1.1% (1/88) was widowed. Patients had the diagnosis of IIH from 0 months to 17 years, with a mean of 4.6 years (SD = 4.2 years).

Health complaints. Compared with the nonpatient groups, a greater percentage of the IIH patients reported current headaches, changes in hearing, fatigue, edema, vision loss, and sleep problems (all $p < 0.01$) (figure 1). Additionally, changes in hearing were acknowledged by 13 of 28 (46.4%) of the IIH patients, 7 of 30 (23.3%) of the weight-matched controls, and only 1 of 30 (3.3%) of the normal weight controls. Edema was reported a problem for 16 of 28 (57%) IIH patients, 5 of 30 (16.7%) weight-

Table 1 Demographics, mean (SD)

Characteristic	IIH patients	Weight controls	Normal weight controls	F	p Value
Age, y	33.36 (7.04)	32.4 (6.42)	31.2 (6.33)	0.754	0.4738
Body mass index, kg/m ²	37.42 (7.39)	34.57 (9.48)	21.6 (1.79)	42.59	0.0001*
Education, y	13.75 (2.41)	14.7 (1.9)	15.6 (1.9)	4.43	0.0136

* Pairwise comparisons using Fisher's test indicated idiopathic intracranial hypertension (IIH) patients significantly greater than normal weight controls ($p < 0.05$), weight controls significantly greater than normal weight controls ($p < 0.05$), and no difference between IIH patients and weight controls.

matched controls, and 2 of 30 (6.7%) normal weight controls. Sleep difficulties were reported by 17 of 28 (60.7%) of IIH patients, 14 of 30 (46.7%) of the weight-matched controls, and only 3 of 30 (10%) of the normal weight controls.

Similarly, IIH patients reported other concurrent illnesses including polycystic ovary disease (4/28, 13%), chronic fatigue (2/28, 6%), asthma (2/28, 6%) hypertension (2/28, 6%), and digestive abnormalities, mononucleosis, orthostatic edema, back problems, postpolio, arthritis, depression, and glaucoma (one each, 3%). Weight control patients reported polycystic ovary disease (1/30, 3%), asthma (3/30, 10%), hypertension (1/30, 3%), digestive abnormalities (2/30, 7%), depression (5/30, 17%), endometriosis (2/30, 7%), arthritis (2/30, 7%), thyroid abnormalities (2/30, 7%), glaucoma, and epilepsy. Normal weight control patients reported fewer concurrent illnesses, including thyroid disorder (1/30, 10%), digestive problems (1/30, 10%), and obsessive-compulsive disorder (1/30, 10%).

Medications. Fifteen of the 28 IIH patients (53.6%) were currently using diuretics in active treatment of their increased pressure; of these, 13 (81%) were taking acetazolamide (Diamox, ESI Lederle Generics, Philadelphia, PA), and 2 (12%) were taking furosemide (Lasix, Hoechst Marion Roussel, Kansas City, MO). Forty-three percent (12/28) were taking antidepressants for the treatment of depression or headache. Other medications included 17 of 28 (61%) using headache therapy (nonsteroidal anti-inflammatory, beta-blocker, calcium channel blocker, acute headache medication [isometheptene compound (Midrin, Carrick Labs, Cedar Knolls, NJ), sumatriptan, and others]); 1 of 28 (3%) was using birth control pills; 3 of 28 (10%) reported vitamin use. Other medications included

antihistamines, thyroid medication, antibiotics, and warfarin; almost all patients (27/28; 96%) were taking some form of medication (table 2).

None of the weight-matched controls reported using diuretics. Seven of 30 (23%) reported antidepressant use; 4 of 30 (13%) reported birth control use; 4 of 30 (13%) reported using medications for weight loss (fenfluramine and phentermine). Other medications reported included 2 of 30 (7%) using lorazepam, omeprazole (Prilosec, Astra Merck, Wayne, PA); 4 of 30 (13%) using doxycycline, iron, aspirin, thyroid medication, multiple vitamins, and lamotrigine (Lamictyl, GlaxoWellcome, Research Triangle Park, NC); 13 of 30 (43%) reported using no medications. Of the normal weight controls, none were taking diuretics; 3 of 30 (10%) were using antidepressants; birth control pill use occurred in 10 of 30 (33%); 3 of 30 (10%) were taking vitamins; other medications reported included Synthroid (Knoll Pharmaceuticals, Mt. Olive, NJ) (2/30, 7%), antihistamines (3/30, 10%), and nonsteroidal anti-inflammatory (1/30, 3%). Thirteen of 30 (43%) reported using no medication.

Coping. IIH patients were asked how IIH had changed their lives both positively and negatively. The open-ended question elicited answers that included: "learned to accept help," "met many wonderful people," "slowed me down when overworked," "met new friends," "have become more assertive," [have found that] "I'm not alone," "support of family and friends and co-workers' interest," "have gotten more involved with my own health care," "incentive to lose weight," "realization of how precious life/vision are," "made me aware of the value of vision," and "compassion for others." Three of the 28 IIH patients replied, "There are no positives with IIH," and 11 of the 28 did not respond.

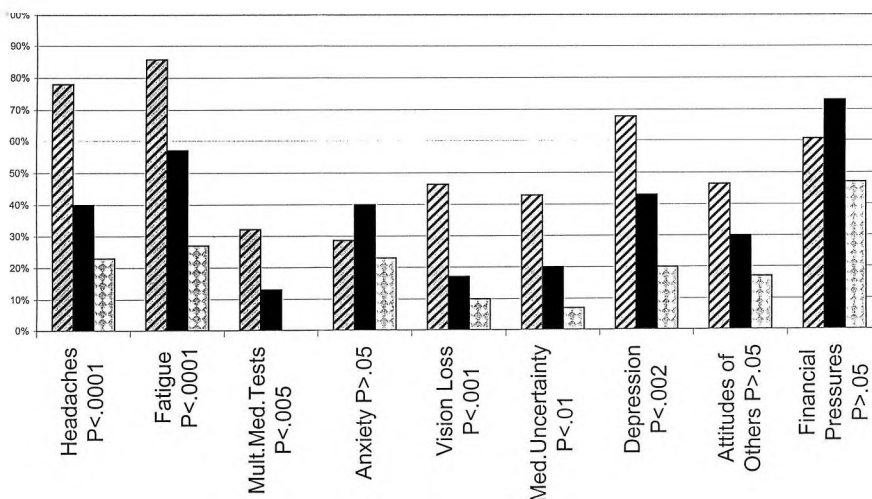


Figure 1. Health complaints as measured by general questionnaire. Anxiety, the attitudes of others, and financial pressures were the only problems reported equally often among the three groups ($p > 0.05$). For all other measures, patients with idiopathic intracranial hypertension (hatched bars) reported greater hardship than did weight controls (dark bars) and normal weight controls (checkered bars) ($p < 0.05$).

Table 2 Medication use

Drug	IIH	Weight control	Normal weight control
Antidepressants	12	8	3
Diuretics	15	0	0
Thyroid	1	4	2
BCP/hormones	2	4	11
Pain medicine	15	2	1
Antihypertensive	4	1	0
Muscle relaxant	3	1	0
Vitamins/herbs	4	2	2
Other			
Obesity drugs	0	4	0
GI drugs	0	4	0
Allergy	0	1	1
Asthma	1	0	1
Other	1	2	0

IIH = idiopathic intracranial hypertension; BCP = birth control pills; GI = gastrointestinal.

The final question on the general health questionnaire asked, "In coping with this condition, what has helped you?" The IIH patients responded as follows: family—20/30; friends—17/28; doctors—19/28; exercise—7/28; others with IIH—10/28; getting information about IIH—18/28; relaxation techniques—5/28; staying busy—17/28.

Depression/anxiety. According to responses on the BDI,¹⁴ IIH patients were significantly more depressed than normal weight controls ($p < 0.002$). The IIH patients also scored higher on state and trait anxiety than the normal weight controls ($p < 0.015$). The tendency toward higher scores for depression and anxiety in IIH patients compared with weight-matched controls was not statistically reliable (table 3). Although the BDI showed no statistically significant difference in depression between IIH and obese controls, IIH patients were in different clinical categories of depression ("mild depression" for weight-matched controls with a mean score of 13.9 versus "moderate depression" for IIH patients with a mean score of 17.3).

Health-related quality of life. Responses to the items on the SF-36 Health Survey were compiled using standard procedures¹⁶ to obtain overall scores for each of the subscales (figure 2). For the subscales of physical function, role physical, bodily pain, and general health, IIH patients

reported significantly less healthy levels of function than weight-matched controls, and both groups reported significantly less healthy levels of function than the normal weight controls ($p < 0.0001$). For vitality, mental health, and role emotional, the IIH patients and weight-matched controls did not differ from each other, but both reported significantly lower levels of function than the normal weight controls ($p < 0.004$). Lower social functioning scores differentiated the IIH patients from both of the control groups, which were not different from each other ($p < 0.002$).

Information obtained from the SF-36 included a self-report item related to current health as compared with 1 year ago. IIH patients and weight-matched controls were significantly more likely to indicate that their general health had declined. However, IIH patients were more likely than weight-matched controls to indicate that their health was "much" worse than a year ago ($\chi^2 = 20.28$; $p < 0.01$).

Discussion. The IIH patients reported here are similar in age as reported in the literature.^{3,4} IIH patients reported similar symptoms as IIH patients in the literature.^{3,4,17,18} Also, as expected, these symptoms were more frequent in IIH patients than either weight-matched or normal-weight controls.

We examined whether the greater prevalence of concurrent illnesses in the IIH group influenced the outcomes related to depression, anxiety, and quality of life. We reanalyzed the quality of life data, omitting the four sickest IIH individuals (with diagnoses that could affect daily functioning, i.e., chronic fatigue, postpolio, and mononucleosis), and there was no significant change in results. This would suggest that other concomitant illnesses are not substantially distorting these data.

Similarly, because 78.6% (22/28) of our IIH sample reported headaches, could simply the experience of headache affect quality of life? Previous studies examining quality of life in patients with migraine¹⁹ and other headache types^{20,21} reported a significant impact on quality of life in the concepts of role physical and bodily pain. Across the remaining concepts, Santanello et al.¹⁹ found that migrainers had comparable scores to the general population. On the other hand, patients with IIH in our study scored significantly lower in all concepts than the normal-weight

Table 3 Depression and anxiety, mean (SD)

Measure	IIH patients	Weight controls	Normal weight controls	F	p Value
BDI Depression	17.61 (13.2)	13.9 (10.2)	7.6 (6.9)	6.75	0.0019
State Anxiety	46.79 (16.06)	41.4 (15.4)	33.6 (11.0)	6.29	0.0028
Trait Anxiety	48.04 (14.59)	43.8 (12.9)	37.0 (11.9)	5.15	0.0078

Pairwise comparisons (Fisher's test) indicated that idiopathic intracranial hypertension (IIH) patients were significantly more depressed than normal weight controls ($p < 0.05$). The IIH patients also had higher state and trait anxiety than the normal weight controls ($p < 0.05$). In both cases, however, the tendency toward higher scores for IIH patients compared with weight controls was not statistically reliable.

BDI = Beck Depression Inventory.

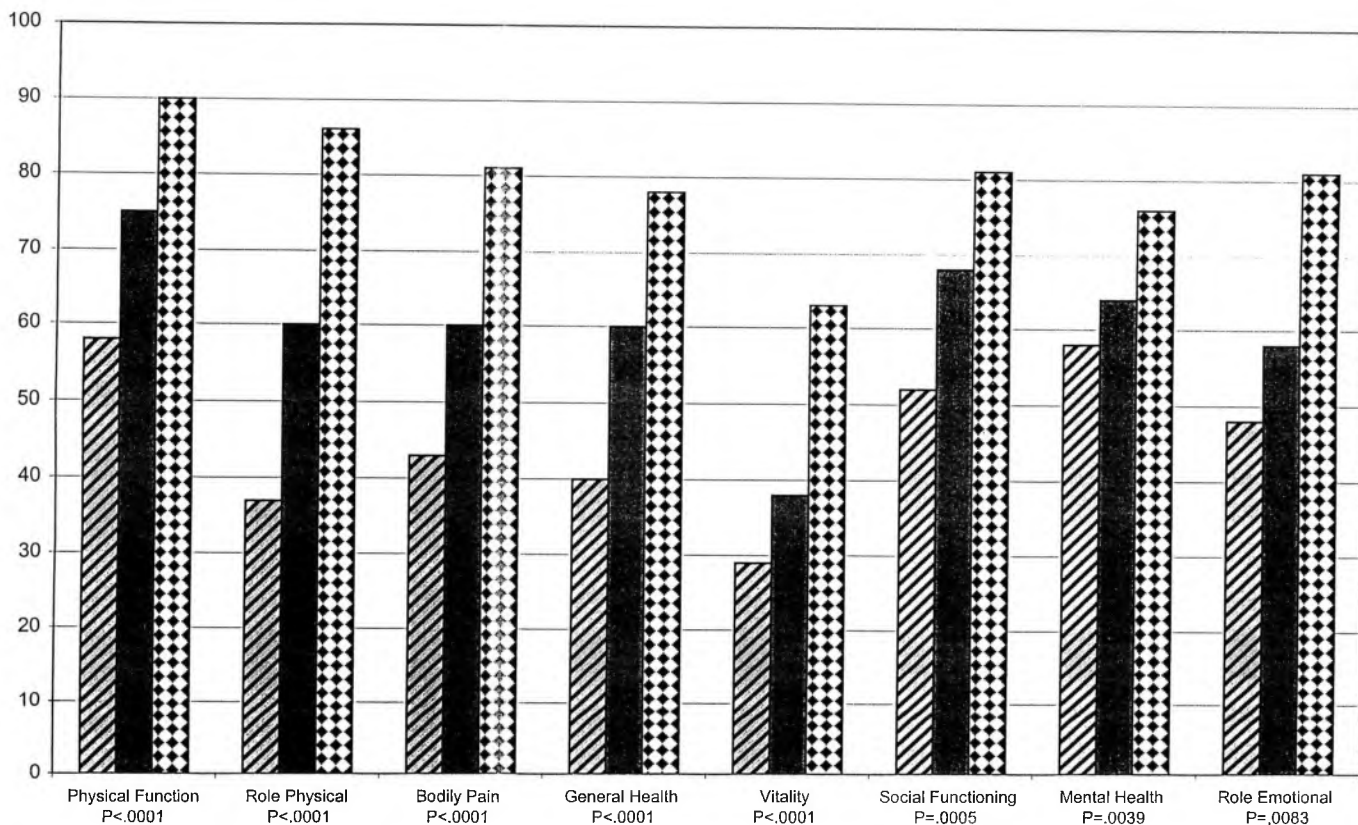


Figure 2. SF-36 health survey of quality of life. Pairwise comparisons (Fisher's test) indicated that idiopathic intracranial hypertension patients (hatched bars) did not differ from weight controls (dark bars) ($p > 0.05$) on measures of vitality, mental health, and role emotional. Weight control patients did not differ from normal weight controls (checkered bars) with regard to social functioning ($p > 0.05$). For all other measures, the three groups were significantly different from each other for all possible comparisons ($p < 0.05$).

controls or migrainers, leading us to conclude that headache alone is not accounting for the lower scores across quality of life concepts.

Fatigue was more commonly experienced in IIH patients than previously reported in the literature, and future research should study whether medication prescribed for IIH patients may influence the severity of fatigue. Current or past sleep difficulties were reported by 23 (82%) of IIH patients, significantly more than both control groups.

Although the three groups did not differ in attitudes of others or financial pressures, IIH patients were affected by hardships of headache, fatigue, medical testing, visual loss, medical uncertainty, and depression. It is interesting to note that in the general questionnaire all three groups self-reported anxiety; however, when the Spielberger State Trait Anxiety Inventory¹⁵ was administered, the IIH patients and weight-matched controls were significantly more anxious than the normal weight controls.

The fact that IIH patients have poorer physical function, poorer general health, more pain, and less ability to meet daily demands than weight-matched controls or normal-weight controls suggests that obesity alone is not the explanation for these difficulties.

Depression was more common in IIH patients and

weight-matched controls, as shown by the BDI and the SF-36 subscales of mental health, role emotional, and vitality. Both of these groups were significantly different from the normal weight controls. Although significant statistical differences between IIH patients and weight-matched controls were not found, the mean scores placed these two groups in different ranges of depression—moderate for the IIH patients and mild for the weight-matched controls. These findings support previous reports in the literature that obesity and depression are frequently seen together.²²

Medication use was different in all three groups. IIH patients tended in general to be taking more medications for both increased pressure and headache. Less than half (13/30, 43%) were taking acetazolamide; therefore, the use of this agent alone cannot explain the patients' fatigue levels. In addition, although both weight-matched controls and IIH patients more often tested positive for depression than normal weight controls, IIH patients tended to be treated more frequently for depression (12 IIH patients were taking antidepressants versus seven weight-matched patients).

Limitations of the study include selection bias of patients from a tertiary care center and patients who were at various stages in their disease process. Although the questionnaires measuring depression,

anxiety, and quality of life are standardized, they are based on self-report and therefore may reflect the biases of the patients.

The use of medication alone may affect the quality of life of our IHH patients. Conversely, perhaps the use of many medications relates to the severity of symptoms and concurrent problems associated with IHH.

Although research packets were mailed to the four men and 58 women on the IHH mailing list, only one man responded, and his data were not included in the study. One would assume that men also would have quality of life issues, but this study may not be generalizable to men.

This study focused on quality of life issues related to a condition that thus far has been investigated solely from the medical/physiologic perspective. Recently, there has been heightened awareness and acceptance of quality of life as a critical outcome of medical treatment. Results from this study reinforce the psychosocial issues in women with IHH. Quality of life issues should be explored and assessed as part of the diagnostic process. Medications should be carefully selected with awareness of frequent multiple concurrent problems. The fact that so many of the IHH patients in this study cited social support (family, friends, doctors, accessing information) as being of help in coping with IHH is an important finding.

As research continues seeking the causes and remedies of IHH, concurrent study is needed exploring treatments that may enhance quality of life for these patients. What is the quality of life in untreated patients? Does quality of life improve over time? Does it improve with treatment, including weight loss? Does it improve with treatment of depression?

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