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Original Research Article

A multidimensional evaluation of patients with idiopathic intracranial hypertension: associations across symptoms, imaging, cerebrospinal fluid findings and medical history

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ABSTRACT

Background: Idiopathic intracranial hypertension (IIH) is a disorder characterized by elevated intracranial pressure without identifiable cause, predominantly affecting overweight women of reproductive age. Headache and visual disturbances are common but often show variable correlation with cerebrospinal fluid (CSF) pressure. This study aimed to evaluate the multidimensional associations among clinical symptoms, imaging, CSF findings and medical history in patients with IIH.

Methods: This cross-sectional study was conducted at the department of neuro medicine, National Institute of Neuro Sciences and Hospital, Dhaka, Bangladesh, from July 2022 to June 2025. A total of 100 patients aged 18-50 years with a confirmed diagnosis of IIH and neuro-ophthalmic symptoms were included. Data were collected through clinical evaluation, lumbar puncture, imaging (MRI/MRV), fundal photography and visual field testing. Statistical analysis was performed using SPSS version 25.0.

Results: The mean age was 26.16±7.49 years, with a strong female predominance (92%). Most patients were overweight or obese. Headache (97%), visual impairment (88%) and cranial nerve palsy (50%) were the predominant symptoms. Papilledema was bilateral in 93% of cases. Elevated CSF opening pressure (>25 cm H_2O) was found in 75% of patients. Hormonal medication use was reported in 33% of cases. No significant association was observed between elevated CSF pressure and visual loss (p=0.02), double vision (p=0.96), or headache (p=0.53).

Conclusions: Symptom severity in IIH may not directly correlate with CSF pressure levels, underscoring the need for comprehensive, multidisciplinary assessment in clinical management.

Keywords: CSF pressure, Headache, Idiopathic intracranial hypertension, Neuro-ophthalmology, Papilledema, Visual disturbance

INTRODUCTION

Headache and visual disturbances are among the most frequent and often overlapping neurological complaints encountered in clinical practice.[1] Their coexistence can signal a wide spectrum of underlying conditions, ranging from benign primary headaches to potentially vision- or life-threatening disorders such as idiopathic intracranial hypertension (IIH), space-occupying lesions, or optic neuropathies.[2] Timely and accurate evaluation of patients presenting with these symptoms is therefore critical for appropriate diagnosis and management.[3]

Idiopathic intracranial hypertension (IIH) is one such condition that typically presents with both headache and visual symptoms.[4] It is characterized by elevated intracranial pressure (ICP) in the absence of a structural brain lesion, hydrocephalus, or infection.[5] The revised diagnostic criteria emphasize the importance of neuro-ophthalmic manifestations, imaging findings and cerebrospinal fluid (CSF) analysis in confirming the diagnosis.[6] Although IIH predominantly affects overweight women of childbearing age, it's presentation can vary considerably, often overlapping with other etiologies of raised ICP or visual dysfunction.[7]

Despite the established diagnostic framework for IIH, clinical variability often complicates assessment. Not all patients with elevated CSF pressure report severe symptoms and conversely, some with only mildly elevated pressures may exhibit significant visual impairment.[8] This discrepancy highlights the importance of a comprehensive, multidimensional approach that integrates symptomatology, imaging, CSF measurements and medication or medical history.[9]

Previous studies have explored individual features of IIH, including radiological signs, risk factors such as obesity and hormonal medications and outcomes of visual dysfunction.[10] However, there remains a paucity of data from South Asian populations, particularly from Bangladesh, where epidemiological and clinical profiles may differ due to genetic, environmental and healthcare access-related factors.[11]

In this context, the present study aims to provide a detailed evaluation of patients presenting with both headache and visual disturbances, focusing on those diagnosed with IIH. The study examined associations among clinical symptoms, radiological findings, CSF pressure measurements and medical history- including medication use such as hormonal agents, antibiotics and vitamin A derivatives. We also assess how these parameters correlate with specific neuro-ophthalmic manifestations like papilledema, cranial nerve palsy and visual impairment.

METHODS

This cross-sectional study was conducted at the department of neurology, National Institute of Neuro Sciences and Hospital, Dhaka, Bangladesh, from July 2022 to June 2025. A total of 100 patients diagnosed with IIH were included. The study population comprised patients aged 18-50 years presenting with neuro-ophthalmic symptoms.

Inclusion criteria

Age 18-50 years. Diagnosis of IIH confirmed by revised diagnostic criteria. Presence of neuro-ophthalmic symptoms (headache, papilledema, cranial nerve palsy, or visual impairment). Willingness to provide informed consent.

Exclusion criteria

Secondary intracranial hypertension (e.g., venous sinus thrombosis, space-occupying lesions). History of optic neuropathy unrelated to IIH. Previous neurosurgical intervention for raised intracranial pressure. Incomplete clinical or imaging data.

Data collection and study procedure

Data were collected through structured clinical evaluations, including detailed history, neurological examination and ophthalmological assessment. CSF opening pressure was measured via lumbar puncture. Imaging studies (MRI/MRV) were performed to rule out secondary causes. Visual function testing included fundal photography and perimetry. All procedures were standardized to ensure accuracy and reproducibility. Data were recorded using pre-designed case report forms and subsequently validated through cross-checking by two independent investigators to maintain reliability and consistency. Informed consent was obtained from all participants. Patient confidentiality was strictly maintained by anonymizing data and restricting access to authorized personnel only.

Statistical analysis

Data were analyzed using SPSS version 25.0. Descriptive statistics were used to summarize demographic and clinical data. Chi-square tests and independent t-tests were applied for group comparisons. Logistic regression analysis was performed to identify predictors of visual impairment. A p value of <0.05 was considered statistically significant.

RESULTS

Table 1 presents the baseline demographic and clinical characteristics of the study population. The mean age was 26.16±7.49 years. The majority of patients (47%) had a BMI between 25 and 29.9 kg/m^2, while 8% had a BMI≥35. Headache was reported by 97% of patients, while visual impairment was observed in 88%. Papilledema was present in both eyes in 93% of patients and unilateral papilledema was noted in 2%. Elevated CSF opening pressure was documented in 75% of patients. Cranial nerve palsy was observed in 50% of the study population.

Figure 1 illustrates the gender distribution among the study population. The majority of patients were female, highlighting the known predominance of women (92%).

Table 1: Demographic and clinical characteristics of our study patients (n=100).

Characteristics		Frequency	Percentage
Mean age (years)		26.16±7.49	
BMI	<24.9	31	31.0
	25-29.9	47	47.0
	30-34.9	14	14.0
	≥35	8	8.0
Headache	Yes	97	97.0
	No	3	3.0
Visual impairment	Yes	88	88.0
	No	12	12.0
Papilledema	Present in one eye	2	2.0
	Present in both eyes	93	93.0
	Absent	5	5.0
Elevated CSF opening pressure	Yes	75	75.0
	No	25	25.0
Cranial nerve palsy	Present	50	50.0
	Absent	50	50.0

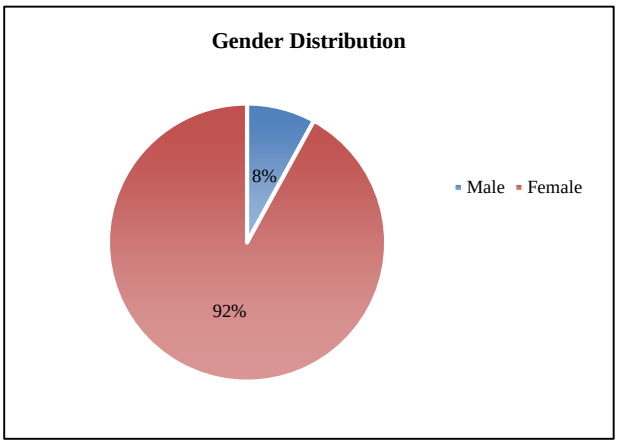

Figure 1: Gender distribution of the study population.

Table 2: Imaging and visual function testing.

Variables	Frequency	Percentage
Imaging abnormalities	4	4.0
Fundal photography taken	96	96.0
Perimetry done	30	30.0

Table 2 summarizes imaging and visual function testing data. Imaging abnormalities were identified in 4% of patients. Fundal photography was performed in 96% of cases, while perimetry was conducted in 30% of patients.

Table 3 outlines the medical history and medication use among the study participants. Hormonal medication use was reported in 33% of patients, representing the most common associated factor. Recent antibiotic use was documented in 5% of cases, while only 2% had a history of using vitamin A derivatives. None of the patients reported lithium use.

Table 3: Medical history and medications.

Factor	Frequency	Percentage
Hormonal medications	33	33
Recent antibiotic use	5	5
Vitamin A derivatives	2	2
Lithium use	0	0

Table 4: Association between CSF opening pressure and symptoms.

Symptom		CSF pressure ≤25 cm (n=36)	CSF pressure >25 cm (n=64)	P value
Visual loss	Yes	0	8	0.02
	No	36	56	
Double vision	Yes	24	43	0.96
	No	12	21	
Headache	Yes	35	62	0.53
	No	1	2	

Table 4 presents the association between cerebrospinal fluid (CSF) opening pressure and key neuro-ophthalmic symptoms in patients with idiopathic intracranial hypertension. A statistically significant association was observed between elevated CSF pressure and visual loss ($p = 0.02$), whereas no significant associations were found with double vision ($p = 0.96$) or headache ($p = 0.53$). These findings suggest that symptom severity may not be directly correlated with the degree of CSF pressure elevation in this patient population.

DISCUSSION

Idiopathic intracranial hypertension (IIH) remains a diagnostic and therapeutic challenge, particularly in young overweight females- a demographic consistently noted in literature and reaffirmed by our findings. In our study, the mean age was 26.16 years and 92% of patients were female, aligning with the classical demographic profile of IIH.[1,12] Similarly, obesity or overweight status was prevalent, with nearly 70% of patients having a BMI≥25 kg/m^2. Mollan et al and Markey et al, have emphasized the strong association between obesity and IIH, suggesting that adipose-related metabolic and hormonal alterations may contribute to cerebrospinal fluid (CSF) dysregulation.[2,13]

Headache was the most prevalent symptom (97%), followed by visual impairment (88%) and cranial nerve palsy (50%). These results closely mirror previously published data by Toscano et al, who highlighted that headache and transient visual obscuration are often the initial manifestations of IIH.[14] Interestingly, although 78% of our patients had elevated CSF opening pressure (>25 cm H_2O), we did not observe statistically significant associations between pressure levels and key symptoms such as visual loss or diplopia. This supports the findings by Bsteh et al, who reported that neither MRI features nor CSF pressure levels are reliable prognostic indicators for visual or headache outcomes in IIH.[8] It raises an important clinical consideration that symptom severity may not always parallel measured intracranial pressure and must be interpreted alongside neuro-ophthalmic evaluation.

Papilledema was present bilaterally in 93% of patients, consistent with the diagnostic hallmark of IIH as described by Friedman et al.[1] Eshun et al demonstrated the utility of optical coherence tomography (OCT) and fundal imaging in differentiating papilledema from pseudopapilledema, particularly in younger populations.[15] In our study, fundal photography was performed in 96% of patients, underscoring its value as a low-cost, reproducible diagnostic adjunct.

Visual field testing using perimetry was performed in only 30% of our cohort, a limitation reflecting either resource constraints or patient-related factors. Visual dysfunction in IIH is often subtle in early stages; thus, routine and serial perimetry is recommended for early detection of visual field loss, as emphasized in consensus guidelines.[2,13]

Our cohort had a relatively high prevalence (50%) of cranial nerve palsy, predominantly affecting the sixth nerve. This is expected, as increased intracranial pressure can lead to mechanical compression or ischemia of cranial nerves with long intracranial courses. Wakerley et al., discussed that abducens nerve palsy is the most frequent cranial neuropathy in IIH, often reversible with pressure-lowering interventions.[16]

From a medical history standpoint, 33% of patients reported recent use of hormonal medications. This is in line with the hypothesis that estrogen and other hormonal agents may influence CSF dynamics and venous outflow, particularly in reproductive-age females.[4,13] Although antibiotic (5%) and vitamin A derivative (2%) usage were less frequent, these agents are recognized contributors to secondary intracranial hypertension, warranting thorough history-taking to differentiate from IIH.[8]

Interestingly, no significant association was found between elevated CSF pressure and symptoms like visual loss (p=0.02), diplopia (p=0.96), or headache (p=0.53). This apparent dissociation has also been noted by Schmidt et al, who used advanced neuroimaging techniques (diffusion tensor imaging) to show that microstructural brain changes may occur in IIH irrespective of pressure readings.[17] This underlines the need for multidimensional evaluation- including imaging, functional testing and symptom scoring- rather than relying solely on CSF pressure.

Our findings support the multifactorial nature of IIH, where pressure measurements alone do not predict disease burden. As pointed out by Guryildirim et al, the clinical spectrum of headache in intracranial hypertension is broad and often overlaps with primary headache syndromes, complicating early diagnosis .[12] Hence, a comprehensive diagnostic approach integrating imaging, fundus evaluation and symptomatology is essential.[18,19]

This study was limited by its cross-sectional design, which prevents assessment of disease progression over time. Visual field testing was underutilized and OCT was not consistently available, possibly affecting the accuracy of visual function evaluation. Additionally, CSF pressure was measured only once and imaging interpretations lacked detailed morphometric analysis. Being a single-center study, the findings may not be generalizable to broader populations.

CONCLUSION

This study highlights the typical clinical profile of IIH- young, overweight females with frequent headaches, visual symptoms and papilledema. Despite elevated CSF pressure in most patients, symptom severity did not significantly correlate with pressure levels, emphasizing the need for comprehensive clinical and ophthalmologic assessment. A multidisciplinary approach remains essential for accurate diagnosis and effective management of IIH.

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REFERENCES

1. Friedman DI, Liu GT, Digre KB. Revised diagnostic criteria for the pseudotumor cerebri syndrome in adults and children. Neurology. 2013;81(13):1159-65.
2. Mollan SP, Davies B, Silver NC, Shaw S, Mallucci CL, Wakerley BR, et al. Idiopathic intracranial hypertension: consensus guidelines on management. J Neurol Neurosurg Psychiatr. 2018;89(10):1088-100.
3. Costello FE, Goyal M. Neuroimaging in neuro-ophthalmology. Neurol Clin. 2010;28(3):757-87.
4. Bruce BB, Kedar S, Van Stavern GP, Monaghan D, Acierno MD, Braswell RA, et al. Idiopathic intracranial hypertension in men. Neurology. 2009;72(4):304-9.
5. Schuman E. Another comment on "Drug induced refractory headache". Headache. 2008;48(8):1242.
6. Outteryck O. Author response: optical coherence tomography for detection of asymptomatic optic nerve lesions in clinically isolated syndrome. Neurology. 2021;96(7):352.
7. Marzoli SB, Criscuoli A. Headaches attributed to visual disturbances. Neurol Sci. 2015;36(Suppl 1):85-8.
8. Bsteh G, Marik W, Krajnc N, Macher S, Mitsch C, Pruckner P, et al. MRI features of idiopathic intracranial hypertension are not prognostic of visual and headache outcome. J Headache Pain. 2023;24(1):97.
9. Behzadi F, Alhusseini M, Yang SD, Mallik AK, Germanwala AV. A predictive model for intraoperative cerebrospinal fluid leak during endonasal pituitary adenoma resection using a convolutional neural network. World Neurosurg. 2024;189:e324-30.
10. Cadiot D, Longuet R, Bruneau B, Treguier C, Carsin-Vu A, Corouge I, et al. Magnetic resonance imaging in children presenting migraine with aura: association of hypoperfusion detected by arterial spin labelling and vasospasm on MR angiography findings. Cephalalgia. 2018;38(5):949-58.
11. Khalili N, Wang R, Garg T, Ahmed A, Hoseinyazdi M, Sair HI, et al. Clinical application of brain perfusion imaging in detecting stroke mimics: a review. J Neuroimag. 2023;33(1):44-57.
12. Guryildirim M, Kontzialis M, Ozen M, Kocak M. Acute headache in the emergency setting. Radiographics. 2019;39(6):1739-59.
13. Markey KA, Mollan SP, Jensen RH, Sinclair AJ. Understanding idiopathic intracranial hypertension: mechanisms, management and future directions. Lancet Neurol. 2016;15(1):78-91.
14. Toscano S, Lo Fermo S, Reggio E, Chisari CG, Patti F, Zappia M. An update on idiopathic intracranial hypertension in adults: a look at pathophysiology, diagnostic approach and management. J Neurol. 2021;268(9):3249-68.
15. Eshun EL, Gwin JC, Ditta LC. Peripapillary hyperreflective ovoid masslike structures in a pediatric population referred for suspected papilledema. J Am Assoc Pediatr Ophthalmol Strab. 2022;26(5):242-e1.
16. Wakerley BR, Tan MH, Ting EY. Idiopathic intracranial hypertension. Cephalalgia. 2015;35(3):248-61.
17. Schmidt C, Wiener E, Lüdemann L, Kunte H, Kreutz KM, Becker N, et al. Does IIH alter brain microstructures? a DTI-based approach. Headache J Head Face Pain. 2017;57(5):746-55.
18. Seo SH, Hwang K, Ji SY, Han JH, Kim CY. Surgical management and long-term results of Rathke's cleft cyst. J Korean Neurosurg Soc. 2023;66(1):82-9.
19. Wei HL, Tian T, Zhou GP, Wang JJ, Guo X, Chen YC, et al. Disrupted dynamic functional connectivity of the visual network in episodic patients with migraine without aura. Neur Plast. 2022;2022(1):9941832.

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