












Study of association of headache with hypertension in the patients attending at specialized clinic of a tertiary care hospital

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Abstract

Background: High blood pressure, or hypertension, is above-normal blood pressure. Blood pressure fluctuates during the day due to activity levels. Consistently elevated blood pressure can lead to a hypertension diagnosis. Research indicates a frequent link between hypertension and chronic daily headaches, including chronic migraines, although the cause remains unclear. The study examined the connection between headaches and hypertension. It involved headache patients from the Headache Clinic at Dhaka Medical College Hospital from July to December 2013.

Methods: A total of 100 patients aged 18 years or above from both sexes, with the main complaint being headaches, were enrolled in this study. All questionnaires were checked very carefully to identify the error in collecting data. Data processing work consisted of registration of schedules, editing, coding, and computerization. Data were presented in graph, pie chart and tabulated form and finally analyzed on computer-based software SPSS Windows (16.0 version).

Result: Almost all of the patients were aged 20–50 years, with a male-to-female ratio of 1:3, while 57% of the women were housewives. Most (84%) were married. Headache duration was 4.6 ± 3.3 years on average, and 64% lasted from 1 to 6 h (avg. 5.48 ± 3.31 h). The most common were constant headaches (63%). 3% was seen in radiation on the left side, while 9% on the neck, and 2% on the entire head. Nausea, vertigo, and photophobia were common symptoms. Precipitants were anxiety (39%), fatigue (24%), and sleep disturbance (21%). Relief measures were sleep (51%) and medication (50%). Hypertension was present in 21%, of which 14% were controlled and 7% were uncontrolled. No correlation was found between headache and hypertension duration. Fundus was normal in 97%, and 3% had cataracts.

Conclusion: Headaches were more common in the 3rd decade and females were predominant. Stage I and Stage II hypertension were 14.0% and 7.0%, respectively. Non-migrainous was more frequent. This study data have revealed that headache and hypertension are not associated.

Keywords: Chronic headaches, hypertension, migraines, nausea, photophobia, vertigo

Introduction

The link between headaches and hypertension has long been debated and concerns many patients. At present, medical research tends to prioritize recent studies, often neglecting older ones. Nevertheless, older research remains valuable due to the historically higher rates of severe hypertension and lower awareness. The main issue is that both conditions are common, leading many hypertensive patients to report headaches. In 1913, Janeway suggested a link between headaches and hypertension.^[1] Subsequent studies were confused due to conflicting results. The absence of controlled trials contributed to the belief that headaches and hypertension are directly related. This connection has been highlighted in both older and newer research.^[2-9] Medicine, particularly in the context of evidence-based practice, is continuously evolving. Older studies have influenced the perception of hypertension, leading to the misconception that headaches are a significant feature. Back then, hypertension classifications were inadequate, but current guidelines like JNC-7 and the upcoming JNC-8 have improved our understanding. Headache classifications have also recently become more accurate.^[10] Headaches occur when specific nerve fibers activating blood vessels in the brain are stimulated; most of these fibers are found in the trigeminal and cervical ganglia. While secondary headaches have identifiable causes, most chronic headaches are primary disorders like migraines or tension headaches. The prevalence of these headaches in the hypertensive population remains unclear. Differentiating primary from secondary disorders requires a thorough history due to varied headache types in patients. Identifying headache causes in hypertensive patients can be complex and time-intensive. Migraine primarily affects younger adults, while hypertension is more common in older individuals. The physiological mechanisms linking headaches to hypertension are still debated. Uncontrolled hypertension may worsen migraine frequency and severity or convert episodic migraines to chronic headaches. A study found that 31% of untreated severe hypertension patients reported headaches compared to 15% of

treated patients.^[1] In Italy, hypertension was linked to medication overuse headaches.^[11] Conversely, a Brazilian study found no association between headaches and hypertension in individuals over 17.^[12] Interestingly, another study suggested that higher systolic blood pressure correlates with fewer headaches.^[13] Bangladesh has a population of 162.2 million, with 26% in urban areas and 74% in rural settings. Many headache sufferers utilize non-pharmacological pain relief strategies. It remains unclear if these behaviors are specific to headache types or general reactions to pain. Insufficient data on incidence exists due to limited resources and prioritization. According to the 2012 yearbook from Dhaka Medical College and Hospital, 2.78% of inpatients were treated for hypertension, while 45.49% of neurology clinic patients had headaches. This study initiative was systematically structured with the distinct purpose of probing and comprehensively analyzing the relationship that exists between the frequency of headaches and the condition of hypertension, to identify any potential links or fundamental mechanisms that may unite these two health concerns.

Methods and Materials

This hospital-based observational descriptive study was conducted from July to December 2013 in the Neurology Department at Dhaka Medical College Hospital (DMCH), focusing on headache patients from the Headache Clinic. A purposive, non-probability sampling method was used, including patients aged 18 years and above with headache as their primary complaint, while those with severe mental illness, active stroke, fever, sinusitis, or severe comorbidities were excluded. Data collection involved a standardized questionnaire, carefully reviewed for accuracy. Information was processed through registration, editing, coding, and computerization, with analysis performed using SPSS/PC software, and results presented through tables, graphs, and charts in MS Excel. $P < 0.05$ was considered statistically significant. To ensure data quality, a structured work manual was developed, and the questionnaire was pretested for clarity. Ethical considerations were strictly

followed, with voluntary participation, informed consent in Bangla, confidentiality, and private interviews conducted at a convenient time and place for participants.

Results

Table 1 represents a comprehensive overview of the study population, categorizing them according to their fundamental characteristics and attributes that are essential for understanding the demographics involved in the study. It was observed that half (50.0%) of the patients were between the ages of 21 and 30 years, with a mean age of 32.19 ± 8.09 years and a range of 20–50 years. There were 25 patients (25.0%) who were male and 75 patients (75.0%) who were female, according to the study's sex distribution. The ratio of male to female was 1:3. It was found that the bulk of the study participants 57 or 57.0% were housewives, followed by students (13.1%) and businessmen (12.0%). The table presents other findings. The study found that the majority of the patients (98, or 98.0%) practiced Islam, whereas two individuals (2.0%) had Hinduism as a religion. Marital status of the study participants, it was revealed that 16 were unmarried (16.0%) and 84 were married (84.0%) [Table 1].

The bar and line chart in Figure 1 demonstrate that the majority of the study participants 46, or 46.0% had been unwell for 1–5 years. With a range of 15 days–12 years, the mean sickness was determined to be 4.6 ± 3.3 years. Nearly two-thirds (64.0%) of the trial participants experienced headaches lasting between 1 and 6 h. The headache duration ranged from 15 min to 240 h, with an average duration of 5.48 ± 3.31 h [Figure 1].

The distribution of study participants is shown in detail in Table 2, which is specifically categorized based on the unique patterns of headache presentations. It was found that the study patients' marital status was found in 84 cases (84.0%) of married patients and 16 cases (16.0%) of unmarried patients. Nearly two-thirds (63.0%) of the study participants had continuous periodicity, followed by 25 (25.0%) who had periodicity and 12 (12.0%)

Table 1: Distribution of study population based on Basic characteristics

Basic characteristics	Number of patients (n)	Percentage
Age (in years)		
≤Age	6	6
21–30	50	50
31–40	28	28
>40	16	16
Sex		
Male	25	25
Female	75	75
Occupational status		
Housewife	57	57
Student	13	13
Businessman	12	12
Textile mill worker	5	5
Service	4	4
Garments worker	4	4
Tailors	3	3
Taxi driver	2	2
Religion		
Islam	98	98
Hinduism	2	2
Marital status		
Unmarried	16	16
Married	84	84

who had occasional periodicity. The study subjects' radiation levels were found to be 3 (3.0%) on the left side of the head, 9 (9.0%) on the neck, 3 (3.0%) on the entire body, 2 (2.0%) on the entire head, and no radiation (83, 83.0%), demonstrates the characteristics of the study participants. It was found that the bulk of the patients 61 or 61.0% had compressive pain, followed by 33, or 33.0%, who had pulsating pain, 14.0%, or heavy pain, and 11.0%, or dull pain. The table shows further results [Table 2].

A comprehensive overview of the distribution of study participants by symptom presentation is given in Figure 2, which also shows that, of the

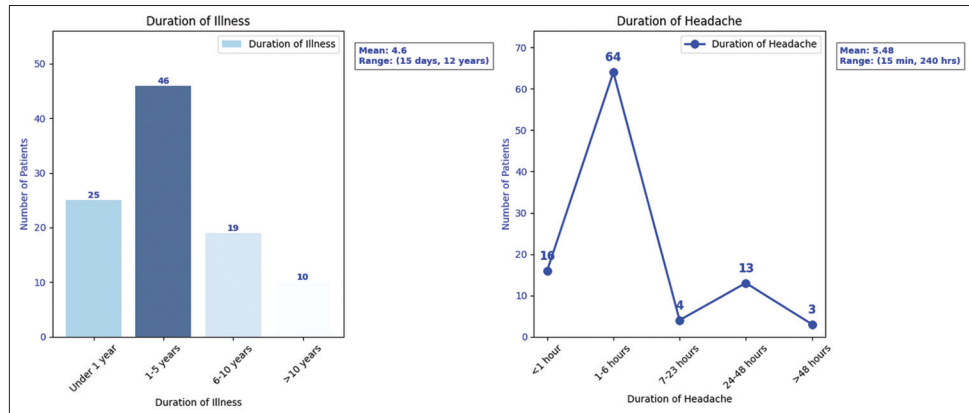


Figure 1: Distribution of study population based on illness and headache

Table 2: Distribution of the study patients based on pattern of headache

Pattern of headache	Number of patients (n)	Percentage
Periodicity		
Continuous	63	63
Periodic	25	25
Occasional	12	12
Radiation		
Left side of the head	3	3
Neck	9	9
Whole body	3	3
Whole head	2	2
No radiation	83	83
Character		
Compressive	61	61
Pulsatile	33	33
Heavy	14	14
Dull	11	11
Penetrating	6	6
Tingling	4	4
Burning	3	3
Electric shock	2	2

different co-existing symptoms, the largest group of respondents were those who reported nausea, vertigo, photophobia, and visual disturbances (60, 34, 33, and 17 respondents, respectively). In addition, numerous other respondents reported

fewer symptoms, including nine who reported vomiting, six who reported insomnia, five who reported discomfort, two who reported stiffness, three who reported feeling as though their chest was constricted, and two more who reported tinnitus [Figure 2].

Table 3 showed how study participants were distributed based on headache regulatory factors. 39 (39.0%) of patients reported anxiety as a precipitating factor, followed by 24 (24.0%) who reported fatigue, 21 (21.0%) who reported sleep disturbances and sensitivity to sunlight, 16 (16.0%) who were affected by activities, and 14 (14.0%) who cited stress. Six (6%) also mentioned travel, five (5%) mentioned warmth, three (3%) mentioned menstruation, none reported cold, and three (3%) identified other factors. Among the survey participants, the most common relieving factors were 51 (51.0%) who found comfort through sleep and 50 (50.0%) who found relief through medication; however, the latter had fewer respondents (39, 39%) [Table 3].

Based on the history of hypertension data in Figure 3, it was found that 21 people (21.0%) had hypertension, and 12 of them (12.0%) had it for 1–5 years. Fourteen individuals (14.0%) had their hypertension under control. Nine patients (9.0%) were given Amlodipine, six patients (6.0%) were given Losartan Potassium, four patients (4.0%)

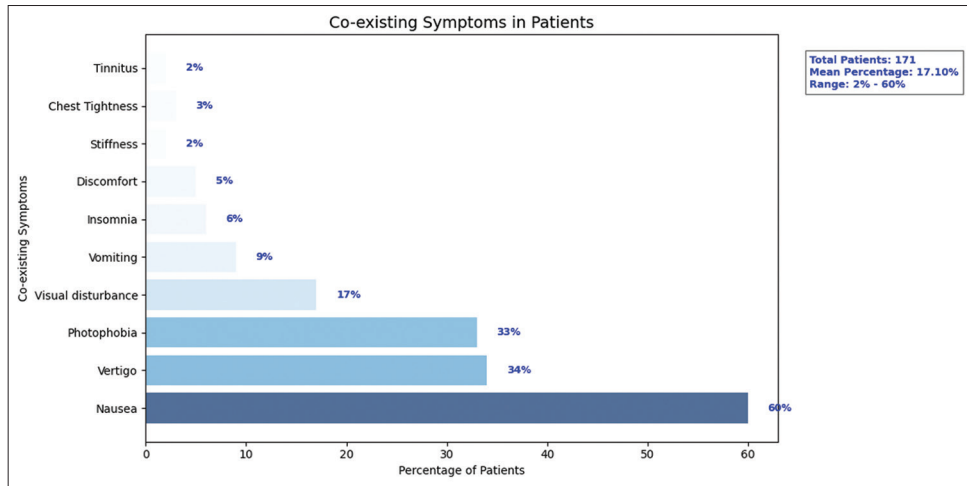


Figure 2: Distribution of the study patients by symptomatic presentation

Table 3: Distribution of the patients based on regulatory factors of headache

Regulatory factors	Number of patients (n)	Percentage
Precipitating factors		
Anxiety	39	39
Fatigue	24	24
Sleep disturbance	21	21
Sunlight	21	21
Activities	16	16
Stress	14	14
Journey	6	6
Warm	5	5
Menstruation	3	3
Cold	0	0
Others	3	3
Relieving factors		
Sleep	51	51
Medication	50	50
Rest	39	39

were given Amlodipine plus Atenolol, and two patients (2.0%) were given Atenolol [Figure 3].

The distribution of the study patients according to H/O and HTN is shown in Table 4. According to the study participants' blood pressure data, 79 patients

(70.0%) had normal blood pressure, 14 patients (14.0%) had Stage I hypertension, and 7 patients (7.0%) had Stage II hypertension. According to the fundus data, 3 patients (3.0%) had senile mature cataracts, whereas the majority of 97 patients (97.0%) had normal fundus. Based on migrainous and non-migrainous data, the HTN data reveals that the study was carried out on three classified patients: Stage I, Stage II, and normotensive. Stage I had four migrainous and ten non-migrainous respondents, while Stage II had two migrainous and five non-migrainous respondents. No significant associations were found between headache and hypertension [Table 4].

Discussion

The study included 100 headache patients from DMCH, Dhaka, from July to December 2013, aged 18 and older. Those with severe mental illness, active stroke, fever, sinusitis, or severe comorbidities were excluded. Findings were compared with previous research. We found that 50% of patients were in their 30s, with a mean age of 32.19 years, ranging from 20 to 50. Haque *et al.*^[14] reported that 58.6% were in their 30s, 18.2% were in their 20s, and very few were below 10 or above 60. Conversely, Junior *et al.*^[15] found a higher average age of 42.6 years, suggesting age variations may result from life expectancy and

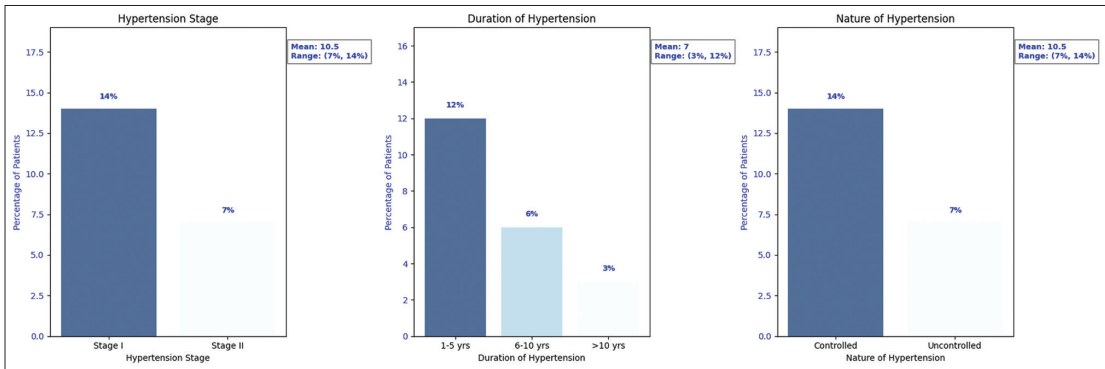


Figure 3: Distribution of study population based on hypertension stages, duration, and nature

Table 4: Distribution of the study patients based on H/O HTN

H/O	Number of patients (n)	Percentage
Blood pressure		
Normal	79	79
Treatment history		
Amlodipine	9	9
Losartan Potassium	6	6
Amlodipine+Atenolol	4	4
Atenolol	2	2
Fundus		
No abnormality detected	97	97
Senile mature cataract	3	3

HTN	Migrainous		Non-Migrainous		Total	P-value
	n	%	n	%		
Stage I	4	4	10	10	14	0.146 ^{ns}
Stage II	2	2	5	5	7	
Normotensive	9	9	70	70	79	

racial factors. The prevalence of headaches was noted as 11% in men and 22% in women, according to Rasmussen *et al.*^[3] Migraine prevalence was 6% in men and 15% in women, with tension-type headache prevalences at 63% and 86%, respectively; a significant male: female ratio of 1:3 for migraine and 4:5 for tension-type headache was found. In the current study, 25% of patients were male and 75% female, reinforcing that headaches are more common in females. Similar findings regarding the prevalence of headaches in females were reported by Haque *et al.*,^[16] and Junior *et al.*^[15] Herein, most patients (57%) were housewives, 13% students,

and 12% businessmen. The majority of patients (98%) were Muslim, with 2% being Hindu. Married individuals made up 84% of the sample, while 16% were unmarried. The study revealed that 46% of patients had experienced headaches for 1–5 years, with a mean duration of 4.6 ± 3.3 years, ranging from 15 days to 12 years. Junior *et al.*^[15] reported that 65.4% of inhabitants experienced headaches over 12 months. 64.0% of patients who experienced headaches for 1–6 h have been found in this study, with an average duration of 5.48 ± 3.31 h. The analysis of patients found that 63.0% of them had continuous headaches, while 25.0% had periodic and

12.0% occasional headaches, with radiation reported in only a few cases. Most patients (61.0%) reported compressive pain, followed by pulsatile (33.0%) and other types of sensations. In addition, 60.0% of patients experienced nausea, with other symptoms including vertigo (34.0%), photophobia (33.0%), and vomiting (9.0%). Previous studies showed nausea and photophobia were common in patients with headaches. In this series, it was observed that 39.0% of patients had anxiety followed by 24.0% fatigue, 21.0% sleep disturbance, 21.0% sunlight, 16.0% activities, and 14.0% stress, journey 6.0%, warm 5.0%, menstruation 3.0% and others 3.0% as precipitating factors. Hoque *et al.*^[16] obtained mental stress 34.0% and sunlight 30.9% were common triggering factors whereas a sound sleep-relieved headache in the majority 59.4%. In another study of patients with migraine headaches, Robbins^[17] observed similarly that stress was the most cited precipitating factor. Stress/anxiety does so by the central mechanism through direct activation of the ascending reticular pathway. Other factors such as journey, physical activity, exposure to cold/warm, and reading were also common in both groups of patients and did not show any significant difference. Contrary to this finding, in a population-based study in Croatia Zivadinov *et al.*^[18] showed that stress was associated with migraine whereas physical activity was related to TTH. The Croatian study found stress linked to migraines and physical activity related to TTH, with weather changes also affecting migraine patients with aura. Common triggers such as stress and anxiety were similarly distributed among migraine and TTH patients, and factors like sleep and posture were also prevalent, with massage providing relief for migraines. Interestingly, migraine patients attempted various remedies more often than TTH patients, except for massage. The study suggested that common relief factors were 51% sleep, 50% drugs, and 39% rest. Haque *et al.*^[14] found migraineurs used relief methods more frequently, with significant differences for drugs and massage. Sleep, rest, and posture were utilized by both groups, and drugs and massage helped relieve migraine pain. This contrasts with Bag *et al.*^[19] who reported massage alleviated pain in TTH patients, while Haque *et al.*^[14] noted sleep

and posture also significantly relieved migraine pain. 79% of patients had normal blood pressure, 14% had Stage I hypertension, and 7% had Stage II hypertension. Another study reported that 18.8% of migraineurs and 40.6% of non-migraineurs had normal blood pressure, with 40.6% of patients showing hypertension have been found in our analysis. In this series, 21% had hypertension, with varying durations: 12% for 1–5 years, 6% for 6–10 years, and 3% for over 10 years. Kwater *et al.*^[20] found an average hypertension duration of 9.5 ± 8.6 years. 14% had controlled hypertension while 7% had uncontrolled; 9% were treated with Amlodipine, 6% with Losartan Potassium, 4% with Amlodipine + Atenolol, and 2% with Atenolol. Most patients, 97%, had normal fundus, while 3% had senile mature cataracts that have been found in our study. Among migrainous patients, only 4% had Stage I hypertension and 2% had Stage II; in non-migrainous patients, 10% had Stage I and 5% had Stage II, with 9% of migraineurs and 70% of non-migraineurs having normal blood pressure, showing no significant difference. Khan *et al.*^[21] reported 20.06% hypertensive and 79.94% normotensive patients, with 11.52% at Stage I and 8.53% at Stage II hypertension; 1.13% of migraine patients had Stage I, while 0.41% had Stage II, in contrast to 100.39% of non-migrainous tension headache patients at Stage I and 8.13% at Stage II. Bulpitt^[22] noted that untreated severe hypertension patients often reported headaches compared to treated patients. In this current study, it was observed that no correlation between the duration of headache and the duration of hypertension.

Limitations of the study

This was a cross-sectional study where blood pressure was evaluated during a single visit. As a result, the study did not diagnose hypertension but only identified cases of elevated blood pressure. In addition, since the study was conducted in a hospital outpatient setting, the findings should not be generalized to the broader population. Furthermore, the study population was selected from a single hospital in Dhaka city, which may not accurately represent the overall situation across the country.

Conclusion

This study was undertaken to observe the relationship between headaches to hypertension. Headache was more common in 3rd decade and females were predominant and also frequent in married persons. Nausea, vertigo, photophobia, visual disturbance, and vomiting were the more common co-existing symptoms of the patients having headaches. Stage I and Stage II hypertension were 14.0% and 7.0%, respectively. There is no association between the duration of headache and the duration of hypertension. This study data have revealed that headache and hypertension are not associated.

Recommendation

The association of hypertension and headache is complex and needs large, controlled multicenter randomized trials to define the real association. Further studies might be undertaken with a large sample size.

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