

Research Article

Prevalence and Clinical Predictors of Medication Overuse Headaches among Patients with Primary Headache Disorders: A Prospective Study

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ABSTRACT

Background: Medication Overuse Headache is an important and preventable issue in primary headache patients. Regular, unsupervised use of medicines used for acute pain may lead to an increase in headache frequency, increased headache-related disability and the progression to chronic headache. Patients suffering from migraine and other recurrent headache disorders are especially at risk if they take analgesics on a regular basis without medical supervision.

Objective: To determine the prevalence and clinical predictors of medication overuse headache among patients with primary headache disorders.

Methods: The study was a prospective study carried out in a hospital (Akbar Niazi Teaching Hospital, Islamabad) from 1st January 2025 to 15th January 2026. The patients were selected by the non-probability consecutive sampling technique to arrive at 352 patients with primary headache disorders. Demographic data, type of primary headache disorder, headache duration and frequency, headache severity, associate symptoms, sleep disturbances, self-medication, and type and frequency of medication use were collected. Patients with a pre-existing primary headache disorder were assessed for medication overuse headache based on the regular use of acute headache medication for over three months. Data were analysed by SPSS. Where applicable, the following tests were used: chi-square test, independent sample t-test, and binary logistic regression. A p value of < 0.05 was deemed statistically significant.

Results: Out of 352 patients, medication overuse headache was present in 104 patients, giving a prevalence of 29.5%. Migraine was the most common primary headache disorder and was significantly associated with medication overuse headache. Patients with medication overuse headache were more likely to have headache frequency of ≥ 15 days per month, severe headache intensity, longer duration of headache illness, sleep disturbance, self-medication, and use of combination analgesics. On logistic regression analysis, headache frequency of ≥ 15 days per month, self-medication, migraine diagnosis, severe headache intensity, and use of combination analgesics were the strongest independent predictors.

Conclusion: Medication overuse headache was common among patients with primary headache disorders, affecting nearly one-third of the study population. Frequent headache days, self-medication, migraine, severe headache intensity, and combination analgesic use were important predictors. Early recognition, patient counselling, avoidance of unsupervised analgesic use, and timely preventive treatment may help reduce the burden of medication overuse headache.

Keywords: Medication Overuse Headache, Primary Headache Disorder, Migraine, Analgesic Overuse, Self-Medication, Headache Frequency.

INTRODUCTION

Headache disorders are one of the most frequently seen neurological complaints in clinical practice and are an important cause of

pain, functional limitation and quality of life impairment. Primary headache disorders (migraine, tension-type headache, cluster headache and other primary headache

syndromes) tend to recur and are associated with repeated use of acute pain relieving drugs. Medicines are effective in the short term but can make headache patterns worse and contribute to the development of medication overuse headache (MOH) if taken too often or at the wrong time (1-3).

Medication overuse headache (MOH) is a secondary headache disorder that develops when someone has a primary headache condition and takes acute headache medications (triptans, analgesics) too often or for too long. It is clinically important because it can transform an episodic headache pattern to a chronic headache pattern that becomes more disabling. In acute attacks patients can start taking analgesics, but over time the regular use of drugs can lead to an increase in the occurrence of headache. Thus, headache becomes a vicious circle of medication use and increased headache due to medication use (4-6).

Migraine is the most relevant setting – the attacks of migraine are often severe and accompanied by nausea, vomiting, photophobia, phonophobia and restriction of the daily activities. In such patients, doses of analgesics or the combination medications may be repeated to maintain routine activities. Sometimes patients who suffer from tension-type headaches can also suffer from medication overuse headache when they take analgesics regularly for persistent or frequent headaches. Additionally, easy access to over the counter medications, lack of awareness, delayed access to specialists and self-medication further heighten the risk of overuse of medications (7-9).

The following are some clinical factors that can play a role in the development of medication overuse headache. These are female gender, duration of headache disorder, high headache frequency, severe pain intensity, sleep disturbance, psychological stress, anxiety or depressive symptoms and combination analgesics. Self-medication is another crucial factor, especially in places where drugs for pain are readily available without a prescription. Patients often do not know that regularly taking common painkillers like NSAIDs, Paracetamol and combination analgesics can make headache worse (10, 11).

The early recognition of medication overuse headache leads to easily preventable and treatable outcomes. History of the number of headache days, the number of medication use days, the type of medication, the length of time

the medication has been used and whether it was prescribed or not is important in all patients with recurrent headache. The identification of the high-risk patient can help the clinician offer timely counselling, minimize the use of unnecessary medications, initiate preventive therapy if warranted, and enhance long-term headache control (12, 13).

Despite the clinical importance of medication overuse headache, it is often under-recognized in routine practice, particularly among patients presenting with chronic or frequent headache. Local data regarding the prevalence and predictors of medication overuse headache among patients with primary headache disorders are limited. Therefore, the present study was conducted to determine the prevalence of medication overuse headache and to identify its clinical predictors among patients with primary headache disorders presenting to Akbar Niazi Teaching Hospital, Islamabad.

METHODOLOGY

This prospective study was conducted at Akbar Niazi Teaching Hospital, Islamabad, from 1st January 2025 to 15th January 2026. The study was designed to determine the prevalence of medication overuse headache and to identify clinical predictors associated with medication overuse among patients presenting with primary headache disorders. Patients were recruited from the outpatient neurology and medicine departments during the study period. A total of 352 patients fulfilling the eligibility criteria were included through non-probability consecutive sampling.

All adult patients (aged 18 years and over) with a primary headache disorder (primary migraine, primary tension-type headache, primary cluster headache or other primary headache type) were considered for inclusion. Primary headache disorder was diagnosed based on clinical history and examination based on standard headache classification criteria. Secondary headaches, for example due to intracranial space-occupying lesion, meningitis, traumatic brain injury, sinusitis, uncontrolled hypertension, cerebrovascular disease and other systemic disorders causing headache, were excluded. Patients who did not have complete medicines history and also who did not agree to participate were additionally excluded from the research study.

Informed consent was obtained and data were collected on a structured proforma. The information in the proforma consisted of

sociodemographic data (age, gender, place of residence, educational status, job, and socioeconomic status). Clinical data on headache comprised primary headache disorder, headache illness duration, headache days/month, headache severity, associated symptoms, family history of headache, sleep disturbance, anxiety and/or depressive symptoms, and missed work or school days due to headache. The severity of headache was clinically graded as mild, moderate or severe based on patient reported pain level and on interference with daily life.

The medication use was evaluated in detail for each patient. Data on the type of medicine taken for headache, number of times the headache was treated with medicine each month, for how long the headache patient had been taking medicine regularly, whether the person took one or more than one medicine for their headache, whether the person treated their headache without his/her doctor's advice, and whether he/she took the medicine as prescribed by his/her doctor or without medical advice was collected. Common drugs used were non-steroidal anti-inflammatory drugs, Paracetamol, combination analgesics, triptans, ergotamine and opioids. Those having a pre-existing primary headache disorder and complaining of increasing headache frequency and worsening headache, and using acute headache medication on a regular basis for more than three months were classified as having medication overuse headache.

The main outcome variable of the study was the presence or absence of medication overuse headache. Medication overuse headache was defined as number of patients who met the criteria for medication overuse headache/number of patients with primary headache disorders included in the study. The clinical predictors assessed in the study were age, gender, primary headache disorder type, headache duration, frequency and severity,

sleep disturbance, anxiety or depressive symptoms, self-medication and type of overused medication.

Prior to data entry and analysis, all data collected were checked for completeness. All the data were entered and analysed using SPSS software program. The quantitative variables (age and duration of headache) were reported as mean and standard deviation. Qualitative variables (gender, type of headache disorder, medication overuse headache, medication type and self-medication) were expressed as frequencies and percentages. A comparison of patients with and without medication overuse headache was used to look for factors associated with the condition. Categorical variables were analyzed using the chi square test and continuous variables were analyzed using the independent sample t-test when appropriate. The level of significance was determined as $p < 0.05$. To determine independent clinical predictors of medication overuse headache, binary logistic regression analysis was performed. On initial analysis, variables with significant associations (or clinically important) were included in the regression model. Odds ratios (ORs) with 95% confidence intervals (CIs) were computed to assess the strength of association between each of the various predictors and the medication overuse headache. The results were presented in tables with appropriate interpretation.

RESULTS

A total of 352 patients with primary headache disorders were included in the study. The mean age of the patients was 34.8 ± 11.6 years with majority of the patients within the age group of 31-45 years. There was a higher incidence of females than males, and most patients were from urban areas. The majority of the participants were educated at least to the secondary level.

Table 1. Baseline Demographic Characteristics of Study Participants

Variable	Frequency (n)	Percentage (%)
Age group		
18–30 years	112	31.8
31–45 years	158	44.9
46–60 years	66	18.8
>60 years	16	4.5
Gender		
Male	126	35.8
Female	226	64.2
Residence		
Urban	218	61.9

Rural	134	38.1
Education level		
Illiterate	42	11.9
Primary	64	18.2
Secondary	146	41.5
Higher education	100	28.4
Occupation		
Student	68	19.3
Housewife	116	33.0
Employed	104	29.5
Unemployed	64	18.2

The most prevalent primary headache disorder was migraine followed by tension-type headache. A significant number of patients suffered from headache on more than one day

during the last month and most cases had headache for more than a year. Intensity of the headache was often moderate or severe.

Table 2. Clinical Profile of Primary Headache Disorders

Clinical variable	Frequency (n)	Percentage (%)
Type of primary headache disorder		
Migraine	196	55.7
Tension-type headache	124	35.2
Cluster headache	18	5.1
Other primary headache disorders	14	4.0
Duration of headache disorder		
<1 year	72	20.5
1–5 years	176	50.0
>5 years	104	29.5
Headache frequency per month		
<8 days/month	104	29.5
8–14 days/month	136	38.6
≥15 days/month	112	31.8
Headache severity		
Mild	54	15.3
Moderate	168	47.7
Severe	130	36.9
Associated symptoms		
Nausea/vomiting	174	49.4
Photophobia/phonophobia	188	53.4
Aura	58	16.5
Sleep disturbance	156	44.3
Family history of headache	118	33.5

An overall prevalence of 29.5% was found for medication overuse headache in 104 patients out of a total of 352. NSAIDs were the most common drugs to be used excessively followed

by Paracetamol and combination analgesics. Many patients self-medicated, making the use of analgesics without regular medical supervision common.

Table 3. Prevalence and Pattern of Medication Overuse Headache

Variable	Frequency (n)	Percentage (%)
Medication overuse headache		
Present	104	29.5
Absent	248	70.5
Type of medication overused among MOH patients (n=104)		
NSAIDs	38	36.5

Paracetamol	24	23.1
Combination analgesics	22	21.2
Triptans	10	9.6
Opioids	6	5.8
Ergotamine	4	3.8
Duration of medication overuse among MOH patients		
3–6 months	26	25.0
7–12 months	42	40.4
>12 months	36	34.6
Medication intake frequency among MOH patients		
10–14 days/month	34	32.7
15–20 days/month	46	44.2
>20 days/month	24	23.1
Self-medication among MOH patients		
Yes	72	69.2
No	32	30.8

Medication overuse headache patients were more likely to be female, to have migraine, to have longer headache duration, to have a higher monthly headache frequency, to have a high headache intensity, to have sleep disturbance, and to have used medications for

self-treatment. Both clinical severity and uncontrolled use of analgesics were independently associated with medication overuse headache, with these differences being statistically significant.

Table 4. Comparison of Patients With and Without Medication Overuse Headache

Variable	MOH present n=104	MOH absent n=248	p-value
Mean age, years	36.9 ± 10.8	33.9 ± 11.8	0.024
Female gender	78 (75.0%)	148 (59.7%)	0.006
Migraine	72 (69.2%)	124 (50.0%)	0.001
Headache duration >5 years	44 (42.3%)	60 (24.2%)	0.001
Headache frequency ≥15 days/month	58 (55.8%)	54 (21.8%)	<0.001
Severe headache intensity	56 (53.8%)	74 (29.8%)	<0.001
Sleep disturbance	62 (59.6%)	94 (37.9%)	<0.001
Anxiety/depressive symptoms	48 (46.2%)	72 (29.0%)	0.002
Self-medication	72 (69.2%)	92 (37.1%)	<0.001
Use of combination analgesics	22 (21.2%)	20 (8.1%)	0.001
Missed work/study days ≥3 per month	46 (44.2%)	54 (21.8%)	<0.001

Logistic regression analysis was used to determine independent predictors of medication overuse headache. Headache frequency of ≥15 days/month, self-medication, migraine diagnosis, severe headache intensity, and use of combination analgesics were still

significant factors associated with MOH after adjustment. After the adjustment, headache frequency of ≥15 days/month, self-medication, migraine diagnosis, severe headache intensity, and use of combination analgesics were still significant factors associated with MOH.

Table 5. Clinical Predictors of Medication Overuse Headache on Logistic Regression Analysis

Predictor	Adjusted Odds Ratio	95% Confidence Interval	p-value
Female gender	1.68	1.02–2.76	0.041
Migraine diagnosis	2.04	1.24–3.36	0.005
Headache duration >5 years	1.89	1.13–3.15	0.015
Headache frequency ≥15 days/month	3.72	2.21–6.28	<0.001
Severe headache intensity	2.31	1.38–3.86	0.001
Self-medication	3.15	1.91–5.20	<0.001
Use of combination analgesics	2.78	1.42–5.44	0.003

Sleep disturbance	1.74	1.06–2.87	0.029
Anxiety/depressive symptoms	1.58	0.96–2.61	0.071

In total, almost 30% of patients with primary headache disorders had medication overuse headache. Patients with migraine, long history of headache, frequent headache days, severe headache, sleep disturbance and self-

medication were more likely to have the condition. Headache frequency (at least 15 days per month) and self-medication were the best predictors.

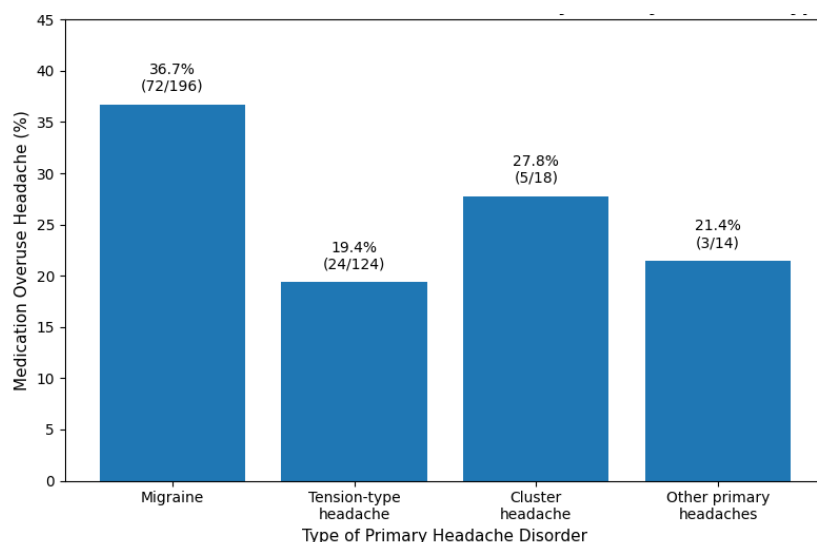


Figure 1. Prevalence of Medication Overuse Headache According To Type of Primary Headache Disorder

The graph shows that medication overuse headache was most common among patients with migraine, followed by cluster headache, other primary headache disorders, and tension-type headache.

DISCUSSION

The present prospective study assessed the prevalence and clinical predictors of medication overuse headache among patients presenting with primary headache disorders. In this study, medication overuse headache was observed in 104 out of 352 patients, giving a prevalence of 29.5%. This finding shows that nearly one-third of patients with primary headache disorders were using acute headache medications excessively and had developed worsening headache patterns. Medication overuse headache is an important clinical problem because it can transform an episodic headache disorder into a more frequent and disabling condition. The high prevalence in the present study highlights the need for careful medication history taking in all patients presenting with recurrent or chronic headache (14, 15).

Primary headache disorders were most commonly migraine and were highly associated with medication overuse headache. The high intensity of migraine headaches, together with

migraine-associated symptoms such as nausea, and/or sensitivity to light and sound, may contribute to individuals being more likely to use repeated analgesics. Patients with migraine may be more likely to use repeated analgesics due to high headache intensity and associated symptoms (nausea, photophobia, phonophobia, functional disability) during headache episodes. In the current study, there were more migraine patients than patients with tension-type headache who reported medication overuse headache. This could be due to migraine attacks being more debilitating and patients taking repeated doses of analgesics in the absence of appropriate medical follow-up. Thus, it may be suggested that migraine sufferers are a high-risk population for medication overuse and should be advised as early as possible to use medications safely (16, 17).

The study also revealed that headache frequency was one of the best predictors of medication overuse headache. Patients who were experiencing headaches for 15 or more days a month were much more likely to develop medication overuse headache than patients with fewer headache days. This correlation is clinically significant as it can lead to a vicious circle: frequent headaches make acute

medications necessary, and repeated application of acute medication increases headache frequency. This cycle can start and patients may then begin to take medicines to prevent the anticipated headache, helping to perpetuate the cycle of medication overuse. The best way to break this cycle is to diagnose the patient, educate them in their condition, discontinue overused medications if needed, and start preventive headache treatment (18). Another significant predictor found in this study was self-medication. Many patients with medication overuse headache were not taking these medications on a physician's recommendation. This may be a result of easily accessible pain-relieving medications, poor understanding of the dangers of frequent use of analgesics, and late treatment by specialists. Common analgesics are considered to be harmless and many patients take them for months without learning that their habitual consumption may lead to headache worsening. This discovery underscores the importance of educating the public, educating healthcare providers on the importance of proper counselling, and regulating unnecessary use of OTC analgesics (19).

The kind of medicine that was administered was also crucial. NSAIDs were the most commonly misused medicines, with paracetamol and combination medicines coming in second. Careful use of these medications is helpful for acute pain management, but when taken at regular intervals and without supervision, these medications can help cause medication overuse headache. In the present study, combination analgesics had a significant association with medication overuse headache. This might be because the combination preparations offer immediate temporary relief and are an incentive to continue using them. Patients can also take more than one medicine at the same time, which makes it more likely to take too much and experience side effects. The medical profession should inquire about medication taken by patients, including over-the-counter drugs (20).

Female gender, long duration of headache disorder, severe headache intensity, sleep disturbance, and anxiety or depressive symptoms were also more common among patients with medication overuse headache. All these factors can contribute to increased headache burden and medication use. Anxiety, depressive symptoms, and sleep disturbance can reduce the pain threshold and lead to more

headaches, and repeated medication use and inadequate coping with chronic pain. Anxiety and/or depressive symptoms were not significant independent predictors in the adjusted model, but were more prevalent in the patients with medication overuse headache, implying that psychological assessment should be considered in patients with chronic headache (21).

The results of this study have clinical significance. All patients with primary headache disorder should be enquired about the number of headache days per month, number of days on which analgesics are used, type of analgesics used and whether the medicine has been prescribed by themselves. Patients should be made aware that regular use of acute headache drugs may lead to a deterioration in headache, rather than an improvement. Prevention, lifestyle changes, better sleep, better stress management and regular follow-up should be encouraged, particularly for patients with migraine, frequent headache days, high headache intensity and self-medication practices (22).

This study has some limitations. It was carried out in one tertiary care hospital which may not be fully representative of the general population. Medication use depended primarily on the patient's medical history, and may have been influenced by recall bias. Psychological symptoms were not measured with specific psychiatric inventories, but were clinically rated. The findings are enhanced by the prospective design, sufficient sample size and careful evaluation of headache and medication-use patterns in spite of these limitations. Medication withdrawal, prophylactic treatment, and patient education were shown to be effective in improving medication overuse headache, but multicenter trials with long-term follow-up are recommended to assess this efficacy.

CONCLUSION

Medication overuse headache was common among patients with primary headache disorders, affecting 29.5% of the study population. It was more frequently observed in patients with migraine, long-standing headache history, high monthly headache frequency, severe headache intensity, sleep disturbance, self-medication, and use of combination analgesics. On regression analysis, the strongest independent predictors were headache frequency of 15 or more days per month, self-medication, migraine diagnosis,

severe headache intensity, and use of combination analgesics. These findings suggest that early identification of high-risk patients, proper counselling regarding safe medication use, avoidance of unnecessary self-medication, and timely initiation of preventive headache treatment may help reduce the burden of medication overuse headache.

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