

## The Prevalence of Osmophobia in Migranous and Episodic Tension Type Headaches

### Abstract

**Background:** Migraines are a neurological disease, of which the most common symptom is an intense and disabling episodic headache. Many persons experience sensory hyper excitability manifested by photophobia, phonophobia and osmophobia. This study was planned to investigate the prevalence of osmophobia in migranous and episodic tension type headache (ETTH). **Materials and Methods:** A semi-structured questionnaire was administered to all patients to evaluate the eventual presence of osmophobia during a headache attack and different characteristics of osmophobia were determined. **Results:** Osmophobia reported in 84% with migranous headache with aura, 74% of migranous patients without aura and in 43.3% of those with ETTH. In 50% of patients, osmophobia was present in all of their headache attacks, 11.7% had osmophobia in more than half of their attacks (from 10 attacks they reported osmophobia in 5-9 ones) and others had this sign in less than half of their attacks (from 10 attacks they reported osmophobia in less than 5 ones). Most frequently the offending odors were scents (88%), foods (54.2%) and cigarette smoke (62.5%). Osmophobia starts 30 min before the headache starts in 22.7% of patients. **Conclusion:** Osmophobia appears structurally integrated into the migraine history of the patient; however, for differential diagnosis with ETTH, other criteria are necessary.

**Keywords:** *Episodic tension type headache, headache, migraine headache, osmophobia*

### Introduction

Osmophobia is the medical term for fear, dislike or aversion to smell or odors. Intolerance to smell is often reported by migraine patients; despite this, the relationship between osmophobia and headaches has not been investigated in depth.

Only two studies have evaluated the presence of osmophobia in migraine attack. The first, prior to the formulation of the [IHS] criteria,<sup>[1]</sup> demonstrated it in 40% of 50 Migraineurs studied;<sup>[2]</sup> the 2<sup>nd</sup>, in a more recent study in a larger patient population, revealed the presence of osmophobia in 25% of migraineurs.<sup>[3]</sup> In a recent epidemiologic study of a Latin American patient population.

Osmophobia in migraineurs was said to be “almost always” present in 47.7% of subjects.<sup>[4]</sup>

The diagnosis of primary headaches are based on the application of clinical criteria, whereas laboratory or instrumental examinations are used only to exclude a secondary cause. No criterion has been

identified as sufficiently sensitive and specific to be considered pathognomonic.

In fact, the International Headache’s Society’s requirements for diagnosing a migraine without aura:<sup>[5]</sup> the person must have at least one of the two following migraine symptoms:

- Nausea and/or Vomiting
- Sensitivity to light – photophobia and/or Sensitivity to sound – phonophobia.

In [ETT] criteria two of the following:

- Pressing/tightening (no pulsating) quality
- Bilateral
- Mild or moderate intensity
- Not aggravated by routine physical activity.

And both of the following two are required:

- No nausea or vomiting
- Possible sensitivity to light or sound but not both.

And, as you see, osmophobia hasn’t been mentioned as a required symptom of migraine and episodic tension type Headache (ETTH) in these criteria.

**Ahmad Chitsaz,  
Abbas Ghorbani,  
Masoumeh Dashti<sup>1</sup>,  
Mohsen Khosravi<sup>2</sup>,  
Mohammadreza  
Kianmehr<sup>3</sup>**

*From the Department of Neurology, Alzahra Hospital, <sup>1</sup>Department of Neurology, Mohammad Rasolalah Hospital, <sup>2</sup>General Practitioner, Alzahra Hospital, <sup>3</sup>Researcher, Medical School, Isfahan University of Medical Sciences, Isfahan, Iran*

### Address for correspondence:

*Dr. Masoumeh Dashti,  
Department of Neurology,  
Mohammad Rasolalah Hospital,  
Isfahan University of Medical  
Sciences, Isfahan, Iran.  
E-mail: dmaseumeh@yahoo.com*

### Access this article online

**Website:** [www.advbiores.net](http://www.advbiores.net)

**DOI:** 10.4103/2277-9175.204587

### Quick Response Code:



**How to cite this article:** Chitsaz A, Ghorbani A, Dashti M, Khosravi M, Kianmehr M. The Prevalence of Osmophobia in Migranous and Episodic Tension Type Headaches. *Adv Biomed Res* 2017;6:44.

**Received:** June, 2012. **Accepted:** October, 2012.

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Moreover, it has been demonstrated that migraine patients in the interictal period present an altered threshold to an olfactory stimulus.<sup>[4-8]</sup> This is in keeping with the concept of cortical hyper excitability in migrainers,<sup>[9]</sup> with reference also to the olfactory processes, as already reported for the visual and auditory systems.<sup>[8,10]</sup>

Some studies showed that osmophobia is very specific for diagnosis of migraine.<sup>[11,12]</sup>

According to other studies osmophobia was a specific but not a very sensitive symptom in differentiating migraine from other primary headaches.<sup>[13]</sup>

Recently, Kelman<sup>[3]</sup> found about 24.7% of adult migraineurs with osmophobia and has suggested that osmophobia is very specific, but very insensitive in diagnosing migraine.

The objective of the present paper was to assess the prevalence of osmophobia in migraines and ETTH patients in Isfahan and determine different characteristics of osmophobia in these patients.

## Materials and Methods

We performed a clinical study on a randomized sample of headache patients referred to our Headache Centre. The patients suffering from migraine were divided into those without (MO) and those with (MA) aura; and those who suffered from (ETTH), chronic tension headache, cluster headache and other trigeminal.

Autonomic cephalalgias, other primary headaches, or multiple headache types were omitted from the study. The diagnosis was formulated on the basis of the diagnostic criteria of the 2004 IHS classification<sup>[5]</sup> following a history performed with an in-person interview. We conducted general Physical and neurological examinations, and; if needed, the exclusion of a secondary cause of headache by laboratory and/or diagnostic tests.

A semi-structured questionnaire was administered to all patients to evaluate the eventual presence of osmophobia during a headache attack and different characteristics of osmophobia were determined by following questions:

(Is there any omophobia in relation with headache attacks, when was the appearance of osmophobia for the first time, the frequency of osmophobia per 10 episodes of last headache attacks, when osmophobia start- up, during migraine or ETTH attacks and which odorant causes osmophobia).

## Results

A total of 300 patients (199 females, 101 males; age  $32.69 \pm 11.2$  years) with a mean age of  $32.69 \pm 11.2$  were recruited from our Headache Centre, of whom, 50 had MO, 100 MA, and 150 ETTH. Among them, 84% with MO ( $n = 42$ ), 85% with MA ( $n = 85$ ) and 43.3% with ETTH ( $n = 65$ ) reported osmophobia. 70.4% of female and 51.5% of male participated patients had osmophobia, as a whole [Table 1].

According to [x2] test, there is a significant relationship between migraine type of headache and osmophobia ( $P < 0.05$ ).

The most common feature of osmophobia appearance for the first time was simultaneous with the headache start [Table 2].

The frequency of osmophobia in the last 10 headache attacks was as follows:

149 patients have had osmophobia in all their attacks, and they were the most common between other groups. 35 patients have had 5-9 times of this symptom, and 8 patients have experienced osmophobia in less than five attacks [Table 3].

Most frequently offending odors were scents (88%), foods (54.2%), and cigarette smoke (62.5%) [Table 4].

Another characteristic of osmophobia was the exact time of osmophobia in relation with headache start and the result was as follow:

21% experienced osmophobia in 10 minutes after beginning of headache and 20% after 10 min.

## Discussion

Osmophobia is often reported during a migraine attack in association with phono \_ and photo \_ phobia. In the appendix of the second edition of the International Headache Society Classification,<sup>[5]</sup> osmophobia has been proposed in the associated symptoms category of the criteria for the diagnosis of migraine.

This study evaluates the prevalence of osmophobia in two kinds of primary headaches: Migraine and ETTH.

There are few studies that have been mentioned osmophobia as one of the main characteristics of these headaches.<sup>[14-16]</sup>

Belau<sup>[2]</sup> documented a frequency of osmophobia in 25 of 50 'migraine' Patients.

**Table 1: Prevalence of osmophobia in study population**

Headache type	With osmophobia	Without osmophobia	Osmophobia %
MO	42	8	84
MA	85	15	85
ETTH	65	85	43.3
Total	192	108	64

**Table 2: Appearance time of osmophobia for the first time**

Headache type	Simultaneous with headache start		<5 Y		>5 Y	
	n	%	n	%	n	%
MO	27	64	9	20	6	14
MA	65	76	17	20	3	3
ETTH	50	76	9	13	6	9

**Table 3: The frequency of osmophobia in 10 headache attacks**

Osmophobia	<5 time		5-9 time		10 time	
	Prevalence	Percent	Prevalence	Percent	Prevalence	Percent
MO	1	32.2	9	29	32	64
MA	6	10	13	13	66	66
ETTH	1	6.2	13	9	51	34
Total	8	2.3	35	11.7	149	49.7

**Table 4: Different odor trigger frequency of osmophobia in acute migraine attack**

Odor type	Prevalence	Percent
Perfume	169	88
Food	104	54.2
Cigarette	120	62.5
Others	97	50.5

Kellman<sup>[3]</sup> evaluated 720 migraineurs and reported lower rate of osmophobia in these patients (24.7%).

In this study we evaluated patients with MO, MA and ETTH. The prevalence of osmophobia was higher than other studies (64%) especially in MO 85% of patients reported osmophobia.

In Zanchin *et al.*<sup>[13]</sup> study osmophobia was just seen in migrainous and none of the patients with ETTH had this symptom. They concluded that osmophobia is a very specific symptom for migraine, and it can be used as a marker for discriminating between migraine (MO and MA) and ETTH.

Kelman<sup>[3]</sup> has suggested that osmophobia is very specific, but very insensitive in diagnosing migraine.

In contrast with these studies, in our research, there was a high prevalence of osmophobia in ETTH patients (43.3%) and so we can suggest that because of very high prevalence of osmophobia in migranous patients, especially in MO (85%), it's very sensitive but not a specific symptom for migraine diagnosis. So in a patient with headache and osmophobia, migraine can be suggested as a main diagnosis but ETTH can't be ruled out.

In the present study, the greater percentage of female had osmophobia than males. 70.4% of female and 51.5% of male patients had osmophobia, as a whole. These results are similar with Kelman<sup>[3]</sup> study in which, the percentage of female with osmophobia and taste abnormality was higher than males. In this study the severity of these symptoms was greater in females too but we haven't checked the severity in our research.

In some studies, the presence of osmophobia has been reviewed just during headache attacks.<sup>[17]</sup>

In the present study; we evaluated the exact time of osmophobia appearance in each attack. sixty eight patients reported the start time of osmophobia 30 minutes before

headache appearance, 64 patients experienced this symptom during the first 10 minutes of headache start and 60 patients had it after 10 minutes and as you see the prevalence in all the groups are the same with no significant difference.

Moreover, osmophobia during attacks is structurally integrated into the headache history of these patients, in fact more than 70% of patients with osmophobia reported that this symptom was present at the beginning of their headache history.

Another evaluated characteristic of osmophobia in our study was the frequency of reported osmophobia in last 10 attacks: It was present in all attacks (>60%). The lowest reported number (2%) was its appearance in less than five attacks. These data are in accordance with other studies.<sup>[12]</sup>

Strong odors are described as a trigger of migraine.<sup>[18,19]</sup>

In the present study, the most offending odorant in migrainous patients were scents (88%), foods odors (54.2%), and cigarette smoke (62.5%).

Perfume or odor trigger was associated with osmophobia in 61.5% in Kelman study<sup>[3]</sup> which in comparison with present research had a lower rate.

In an Italian study,<sup>[20]</sup> 309 patients were involved in the study and they divided into six groups. Approximately, one-third of the patients reported susceptibility to certain foods. The percentage of food sensitivity was not significantly different between patients with migraine or tension type headache, as in our study. This study suggested that foods may trigger not only migraine but also tension type headache attack.

In another study conducted with Fukui *et al.*, as same as our study, perfume and food were the most frequently offending odorant.<sup>[21]</sup>

In these mentioned studies<sup>[3,20-22]</sup> and in our study; both migrainers and ETTH patients reported olfactory stimuli as triggering attacks and just a difference in the percentage of the olfactory trigger was found (respectively, 80% vs. 43% of the two groups), but in Zanchin study<sup>[12]</sup> it was just a complain of migrainers and none of ETTH patients had been olfactory triggers.

### Conclusion

Our data show that osmophobia can be considered a peculiar symptom of migraine, especially Mo and its

presence suggest the diagnosis of migraine but for differential diagnosis with ETTH other criteria are necessary. Moreover, further studies with higher population are highly recommended to evaluate osmophobia in more details in primary headaches.

### Financial support and sponsorship

Nil.

### Conflicts of interest

There are no conflicts of interest.

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