

ORIGINAL RESEARCH

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Evaluation of the relationship between southwest wind parameters and hospital applications related to headache symptoms

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Abstract

Although it is known that headache can be caused by many factors, it is difficult to assess whether it is related to meteorological data. The aim of this study was to investigate the relationship between headache observed in patients presenting to emergency units and the Southwest wind parameters. This was a prospective study including patients over 18 years of age who had presented to the University of Health Sciences Ümraniye Education and Research Hospital emergency unit with headache symptoms between 01.01.2017 and 31.06.2017. The patient data were compared to the parameter "presence of southwest wind", which was obtained from the Forests, Water Sources and Meteorology Directorate Office of Republic of Turkey. Records that were determined to comprise insufficient data were excluded during the data collection. A total of 286 patients were investigated in our prospective study. 93 patients (32.5%) had presented on days when there was southwest wind. 187 had no diagnosed type of headache and were evaluated to have primary headache. Primary headache was more common in patients with no wind exposure, which was statistically significant ($p < 0.05$). No significant difference was observed between genders with regard to admission on windy days ($p = 0.387$). We believe that our study would contribute to studies that investigate the relationship between headache and meteorological parameters, which are limited in number. The fact that there are more hospital admissions when there is no wind exposure indicates that studies required detailed analysis. It is also known by our society that patients who do not apply to the hospital because of the idea that southwest wind is associated with headache.

Keywords: Southwest wind, headache, meteorological parameters, hospital application with headache symptoms, wind parameters.

Introduction

Types of headache may be classified as primary (without an underlying disease and/or drug-substance use) ('and', 'or') secondary (with cause). In secondary headache disorders, the ache is related to another disease and IHS (International Headache Society) criteria provides a scoring system that classifies this group of headaches according to their etiological causes. In primary headache, there is no detectable underlying cause. When considering a patient with headache, secondary headache should be eliminated from the differential diagnosis at the beginning [1].

More than 90% of the patients with headache have primary type headache.

Southwest wind is effective in winter and spring in Turkey. Southwest wind has dry and hot characteristics and slightly

elevates the air temperature [2]. It may lead to fatigue, nausea, and upper airway symptoms.

Although it is known that headache can be caused by many factors, it is difficult to assess whether it is related to meteorological data. There are a limited number of studies showing whether headaches are associated with meteorological events. We preferred this prospective study because there may be deficiencies in the evaluation of our study with recorded data. In addition, differences in the cultural level of our patients and their capacity to define pain and of course subjective symptoms were limited in our study.

The aim of this study was to investigate the relationship between headache observed in patients presenting to emergency units and the southwest wind parameters. The patients were classified according to meteorological data. Patients with additional symptoms except headache were noted. Primary-secondary headache distinction was made according to the anamnesis of the patients. Not only limited to the days when the southwest winds were effective, but also questioned whether there was wind exposure.

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Materials and Method

This was a prospective study including patients over 18 years of age who had presented to the University of Health Sciences Ümraniye Education and Research Hospital emergency unit with headache symptoms between 01.01.2017 and 31.06.2017. The patient data were compared to the parameter “presence of southwest wind”, which was obtained from the Forests, Water Sources and Meteorology Directorate Office of Republic of Turkey. Records that were determined to comprise insufficient data were excluded during the data collection.

Ethics committee approval was received in November 2016. Form signed with the consent of patients to be included in our prospective study.

The quantitative data were expressed as mean, standard deviation (SD) and median (minimum – maximum value), and the qualitative data were expressed as case number (n) and percentages (%). The outcomes were evaluated in 95% confidence interval and the significance was accepted at a level of $p < 0.05$.

The study consisted of patients examined by the authors. Record screening was not performed retrospectively. Only prospective cases were collected.

In addition to the demographic characteristics of the patients, exposure to southwest wind, presence of diagnosed headache, frequency of headache, whether the headache was periodic or not, and the presence of known chronic diseases were questioned. The patients were classified according to meteorological data. Patients with additional symptoms except headache were noted. Primary-secondary headache distinction was made according to the anamnesis of the patients. Patients were also asked if headaches were related to southwest winds before. Those who applied on days when southwest winds were effective were asked whether there was wind exposure. Wind exposure was also evaluated. Although evaluation of the patient symptom in retrospective studies can not be performed very well, it has limited our study in which probable headaches of the patients could not be diagnosed in prospective studies. Since there was no problem of not accessing the data, the information was tried to be taken completely and patients whose general status deteriorated and were unable to speak were excluded from the study.

Results

A total of 286 patients were investigated in our prospective study. Among these, 115 were men (40.2%) and 171 were female (59.8%). 209 patients had not been exposed to wind, and among these, 152 had no periodic pain; therefore, the data were observed not to comply with the normal distribution. The median age was 37 years (IQR 26-75), the median value of oxygen saturation was 98% (IQR 96.75-99), the median value of systolic blood pressure was 125 mmHg (IQR 115-140), and the median value of diastolic blood pressure was 75 mmHg (IQR 70-80).

93 patients (32.5%) had presented on days when there was southwest wind. 187 had no diagnosed type of headache and were evaluated to have primary headache. 232 patients (81.1%) had no history of disease; 3 patients (1%) had otitis media, 9 patients

(3.1%) had hypertension, 1 patient (0.3%) had asthma, 1 patient (0.3%) had chronic sinusitis, 1 patient (0.3%) had a history of ischemic cerebrovascular disease, and 39 patients (13.6%) had been followed-up by the neurology clinics due to undiagnosed headache. 14.7% of the patients had a history of trauma, and 10.8% had obesity. 15.7% of the patients described their headache on admission as the most severe pain. 49.3% described repetitive headache, whereas 25.2% stated that they had periodic headache. 209 patients (73.1%) had experienced no wind exposure, whereas 77 patients (26.9%) had.

Periodic headache was more common in patients with no wind exposure compared to those with exposure (79.2%); however, this was not statistically significant. Among the 187 patients with primary headache, 155 had no wind exposure. Primary headache was more common in patients with no wind exposure, which was statistically significant ($p < 0.05$). 20.3% of the patients related their headache to seasons, and 14% to the weather. 173 patients (60.5%) demonstrated no pre-finding, whereas 64 (22.4%) had nausea, 1 (0.3%) had dizziness, 1 (0.3%) had tinnitus, 1 (0.3%) had a cough, 3 (1%) had fatigue, 31 (10.8%) had findings of upper respiratory tract infection, and 12 (4.2%) had hypertension.

Among 209 patients with no wind exposure, 47 (22.5%), and among 77 patients with wind exposure, 46 (59.7%) had headache during southwest wind breeze. The outcomes were statistically significant ($p = 0.000$) (Table 1). No significant relationship was determined between exposure to southwest wind and periodic headache; primary headache on the other hand, was observed more commonly among those with wind exposure. 73.9% of male patients ($n = 85$) and 72.5% of female patients ($n = 124$) had no wind exposure. No significant difference was observed between genders with regard to wind exposure ($p = 0.452$) (Table 2). 33.9% of the male patients with headache on admission, and 31.6% of the female patients were observed to present to emergency unit on windy days. No significant difference was observed between genders with regard to admission on windy days ($p = 0.387$).

Table 1. Wind exposure and headache complaints during southwest wind

	Patients with headache complaints during southwest wind	Patients who don't have headache complaints during southwest wind	Total
Patients with wind exposure	%59.7($n = 46$)	%40.3($n = 31$)	%100 ($n = 77$) ($p = 0.00$)
Patients with no wind exposure	%22.5($n = 47$)	%87.5($n = 162$)	%100 ($n = 209$) ($p = 0.00$)

Among 209 patients with no wind exposure, 47(22.5%), and among 77 patients with wind exposure, 46(59.7%) had headache during southwest wind breeze. The outcomes were statistically significant ($p = 0.000$)

Table 2. Wind exposure and genders

	Wind exposure	No wind exposure	Total
Male	%26.1($n = 30$)	%73.9($n = 85$)	%100($n = 115$) ($p = 0.452$)
Female	%27.5($n = 47$)	%72.5($n = 124$)	%100($n = 171$) ($p = 0.452$)

No significant difference was observed between genders with regard to wind exposure ($p = 0.452$)

Discussion

One of the main complaints of societies, headache, is a symptom that may accompany neurological diseases, as well as systemic diseases, and may lead to personal, social and economic problems.

In our study, the number of patients with southwest wind exposure was 77, whereas the number of patients presenting on windy days was 93. Wind exposure out of certain hours may not mean much, or short exposure may be disregarded by the patients. This prospective study may include fallibility in the 24-hour weather forecast parameters. Thus, in a study investigating the relationship between migraine attack and atmospheric pressure, air temperature and relative humidity, 6 measurements with equal intervals were obtained within a day [3]. Nevertheless, no correlation was determined between meteorological parameters and migraine type headache. We know that headache is a symptom, but it can be seen as the disease itself in our hospitals. It is easier to make this mistake in emergency departments where patient admissions are high. Patient admissions are very high in emergency services. Therefore, sometimes only analgesic is applied to the patient and the disease is not questioned enough.

There are approximately 500.000 patients admitted to the emergency department of our hospital annually. In our study although wind exposure was associated with headache, it was not associated with primary headache. Detailed questioning and each headache should be evaluated separately.

In some studies, a correlation was observed between migraine and cold weather, and in others, increased migraine attacks were observed as the air temperature increased [3-5].

There are studies demonstrating that migraine is affected by alterations in the weather [6] and there are studies reporting that headaches of different types are affected by alterations in the weather [7]. In our study, primary and secondary type headaches were evaluated together and the risk of headache was observed to be increased in patients with wind exposure, which was statistically significant ($p=0,000$).

Different studies have demonstrated that patients with diagnosed headache may report increased or decreased complaints according to the seasons, humidity and temperature. In a study investigating the relationship between cluster-type headache and air temperature, cluster-type headache was observed to be more common in winter months and concluded that both hot and cold air could have different effects on different patients with cluster-type headache [8]. In another study-investigating patients with headache retrospectively, increased number of admission was reported during high and low temperature and humidity. No significant relationship was determined between the phases of the moon and patient admission [9].

Although there are many environmental factors that affect headache, the number of studies investigating the relationship between meteorological parameters and undiagnosed headaches is very limited. There are studies demonstrating the effects of changes in temperature and climate on diagnosed headaches; however, it should be considered that they report varying outcomes. In our study, primary and secondary type headaches were separately

defined and undiagnosed headache was observed in 187 patients. Primary headache was more common among patients with no wind exposure. Secondary headache, which may have different diagnoses, was not evaluated in detail.

The effects of Chinook winds on migraine have been investigated. Accordingly, admissions due to migraine have been observed to increase on days when chinook reached its highest velocity and prior to the days of chinook; however, no pathophysiology could be demonstrated [10]. Instead of the 24-hour forecast of the meteorological data, the duration of follow-up prior to and/or after southwest wind may be delayed, which would lead to a lower number of mistakes.

It was observed in a study comparing loxoprofen sales in pharmacies in Japan and meteorological data that the loxoprofen sale rate was increased when the mean barometric pressure was low, and when there was rain, the mean humidity and minimum humidity rates were increased compared to the day before loxoprofen sale [11].

In a study, admission to emergency units with headache was demonstrated to increase with every 5-degree increase in the air temperature and with the rate of air pollution [12], whereas there are studies demonstrating no relationship between the development or permanency of migraine or headache and subjective perception of the weather [13].

In our study, primary headache was more common among patients with no exposure to wind. In studies with longer duration of follow-up, two studies have investigated the effect of changes in the weather on headache in Uppsala; the various climate properties of the observation period were recorded. The frequency of headache in patients with migraine were found to be lowest on sundays and mondays, and were highest on Thursdays and Saturdays. In patients with stress-related headache, the frequency was highest on Thursdays and Fridays, and was lowest on Sundays and Tuesdays. This pilot study demonstrated that people working in poor weather conditions had headache more frequently. A tendency towards developing headache was determined a day prior to windy days [14].

There are many studies investigating the relationship between meteorological parameters such as humidity, wind and temperature; however, the outcomes of these studies are contradictory to the subjective nature of the perception of both headache symptoms and climate conditions and seasonal changes. Wind exposure, which was questioned in our study, may be classified as subjective as well. Non-exposure to wind on a day when southwest wind is active may not necessarily mean that there would be no headache. Furthermore, undiagnosed periodic and/or repetitive headache were evaluated as primary headache, which was a limitation of our study. Primary headache was more commonly observed in patients with no exposure to the wind; however, when all patients with primary and secondary headache were considered together, among the 77 patients presenting on the days of southwest wind, 46 (59.7%) had developed a headache. This analysis revealed statistical significance ($p=0,000$).

Although evaluation of the patient symptom in retrospective studies can not be performed very well, it has limited our study in which probable headaches of the patients could not be diagnosed

in prospective studies. Of course, what we classified as primary headache also included secondary headaches that were not yet diagnosed. Patients whose general status deteriorated and were unable to speak were excluded from the study so previously stable patients who subsequently deteriorated could not be included in the study it may not be possible to identify some diseases that can be diagnosed by advanced examination and such patients may be considered as primary headache.

Conclusions

Further studies with longer durations of observation that mainly evaluate primary headache and compare meteorological parameters in different countries should be conducted. We believe that our study would contribute to studies that investigate the relationship between headache and meteorological parameters, which are limited in number.

Competing interests

The authors declare that they have no competing interests.

Financial Disclosure

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Ethical approval

Ethics committee approval was received in November 2016. Form signed with the consent of patients to be included in our prospective study.

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