ACU Sağlık Bil Derg 2020; 11(1):78-82
https://doi.org/10.31067/0.2020.244

ARAŞTIRMA YAZISI / ORIGINAL ARTICLE

Assessment of the Relationship Between Emergency Service Admissions due to Primary Headache and Meteorological Parameters

Hatice Şeyma Akça, Sümeyra Acar Kurtuluş, İbrahim Altunok, Can Özen, Serkan Emre Eroğlu

Istanbul University of Health Scienses Ümraniye Education and Research Hospital,Emergency Department, Istanbul, Turkey

Hatice Şeyma Akça, M.D.
Sümeyra Acar Kurtuluş, M.D.
İbrahim Altunok, M.D.
Can Özen, M.D.
Serkan Emre Eroğlu, Acoss. Prof. M.D.

Correspondence:
M.D. Hatice Şeyma Akça
Istanbul University of Health Scienses Ümraniye Education and Research Hospital,Emergency Department, Istanbul, Turkey
Phone: +90 555 562 98 31
E-mail: drhaticeseyma_@hotmail.com

Received : July 03, 2018
Revised : August 07, 2018
Accepted : October 14, 2018

ABSTRACT

Aim: In this study, it was aimed to analyze the relationship between the patients presenting with a headache to the emergency service and the partial meteorological events at the submission date and sub-parameters of these events.

Materials and Methods: In this retrospective study, patients aged 18 years and over without trauma and SVD(Small vessel disease) who were admitted with a primary headache to the emergency service were investigated. The demographical data and the meteorological parameters were analyzed with SPSS v16 (SPSS Inc, Chicago, IL) program. For the normal distribution fitness of the parameters, Kolmogorov-Smirnov and Shapiro-Wilk tests were used, while for other analyzes, square, t-test, one way ANOVA and Tukey tests were used. 95% confidence interval and $p < 0.05$ values were accepted for statistical significance.

Results: A total of 6451 cases were identified according to the study inclusion criteria. The number of males was 2134 (33.1%) and the number of females was 4317 (66.9%). it was determined that the data of our study did not fit the normal distribution. The median age was 37 (IQR 18-94). The median age of the male patients was 37 (IQR 28 - 48) while the median age was 40 (IQR 31 - 50) in female patients. The admission rates of the men who exposed to the Lodos wind were 36,26%, while the admission rates of the women were 63,74% (n=432). In our partial correlation analysis, it was determined that the Lodos condition correlated with age and gender variables in terms of risk of developing a headache. However, no statistically significant correlation was found between wind speed, humidity level and temperature with age.

Conclusion: Our study showed that gender and age are not important in terms of risk of developing a headache, which varies according to humidity, temperature and wind speed. Therefore we suggest that gender discrimination can not be attained in various branches of business according to these parameters.

Keywords: Lodos wind, temperature, headache

PRIMER BAŞAĞRISI NEDENLI ACIL SERVIS BAŞVURULARININ, METEOROLOJIK PARAMETRELERLE İLIŞKISININ DEĞERLENDIRILMESI

Amaç: Bu bildiri ile, Acil servise baş ağrısı şikayetiyle başvuran hastaların mevcut şikayetlerinin, başvuru tarihindeki kısmi meteorolojik olaylarla ve bu olaylara ait alt parametrelerle ilişkisinin analizi amaçlandı.

Materyal ve Metod: Retrospektif olarak planlanan çalışmada, acil servise primer baş ağrısı şikayeti ile başvuran 18 yaş üstü travma ve akut SVH (serebrovasküler hastalık) öyküsü olmayan hastalar araştırıldı. Hastalara ait demografik veriler ile başvuru günlerine ait meteorolojik parametreler SPSS v16 (SPSS Inc, Chicago, IL) programı yardımı ile analiz edildi. Parametrelerin normal dağılıma uygunluğu için kolmogorov-smirnov ve shapiro wilk testleri kullanılırken, diğer analizler için ki kare ve t-test'leri kullanıldı. İstatistiksel anlamlılık için %95 güven aralığı ve $p < 0.05$ değerleri kabul edildi

Bulgular: Çalışma dahil edilme kriterlerine uygun toplam 6451 vaka saptandı. Çalışmaya dahil edilen tüm hastalar arasında kadınların sayısı 4317 (%66.9) ve erkeklerin sayısı 2134 (%33.1) idi ve tüm hastalara ait yaş ortanca değerinin 37 (IQR 18-94) olduğu gözlendi. Kadınların ortanca yaş değeri 40 (IQR 31 - 50) iken; erkeklerin ortanca yaş adeğeri 37 (IQR 28 - 48). Lodos rüzgarlarına maruz kalınan günlerde erkeklerin başvuru oranı %36.26; kadınların başvuru oranı %63.74 (n:432)idi.

Yapılan kısmi korelasyon analizi ile lodos durumunun, başağrısı gelişme riski açısından yaş ve cinsiyet ile ilişkili olduğu gözlendi. Bununla birlikte, rüzgar hızı, nem seviyesi ve sıcaklık ile yaş arasında istatistiksel olarak anlamlı bir korelasyon bulunmadı.

Tartışma Sonuç: Çalışmamızda, nem, sıcaklık ve rüzgar hızı açısından cinsiyet ve yaşın önem arzetmediği gösterilmiştir. Bu nedenle, bu parametrelere göre çeşitli iş kollarında cinsiyet ayrımcılığına gidilmemesi gerektiğini düşünüyoruz.

Anahtar sözcükler: Lodos, hava sıcaklığı, baş ağrısı

Climate itself is the source that meets the needs of human life (1). Air and climate affect human activities, human prosperity and health in many different aspects.

Due to its geographic location, Turkey is amongst the most affected countries by the Mid-latitude cyclones (2,3). Lodos wind (southern wind in Turkey) which is situated in the local wind groups formed by general atmospheric circulations, is effective in the winter and spring months in Turkey. Lodos is a type of wind that has a dry and warm characteristic and it increases the air temperature when it blows (2). It may cause languor, dizziness, upper respiratory tract symptoms.

The International Headache Society divides headaches into two groups as primary and secondary per 2013-β classification. Primary headaches which are not directly related to other diseases constitute 90% of all headaches. In contrast to this satiated headache; a secondary headache may cause more serious complications (4).

This study is aimed to investigate patients who do not have an organic pathology and have a diagnosis of primary headache and the relationship between the effects of weather conditions on the patients' admission day to emergency service.

Methods

In our retrospective study, all patients over the age of 18 who applied with a complaint of emergency headache between December 31, 2015, and January 1, 2017, were included. This study is commissioned with the approval of the hospital ethics committee and demographic data of patients who do not have a disease caused by any acute illness or with a present headache complaint which has no previous or newly acquired pathologic findings. In addition, the identity of the patients was kept secret/confidential.

Data on the patients are compared to meteorological statistics of the occurred real data of the temperature, humidity, wind speed and presence of Lodos which were obtained from " Republic of Turkey Ministry of Forestry and Water Affairs General Directorate of Meteorology". Lodos wind was included to work as a separate parameter by an investigation task forcesince it seems to be a widespread belief among the people and the media that the Lodos wind leads to headache. Records that were found to contain insufficient information during data collection were exempt from statistical examination. Besides, the evaluation of the case was not made to the emergency admissions due to the headache complaints. if patients' current headache, hemorrhagic cerebrovascular disease, secondary to trauma, etc. besides with the diagnosis of an organic / acquired / newly acquired headache.

Statistical analysis

The statistical program of SPSS v16 (SPSS Inc, Chicago, IL) was utilized/used in the analysis of the obtained data. While Kolmogorov-Smirnov and Shapiro-Wilk tests were used for normal distribution suitability, Chi-square Test, t-test, one way ANOVA and Tukey tests were used for other analyzes of the data. Quantitative data were presented with mean, standard deviation (SD) or median (minimum value - maximum value); qualitative data were presented with the number of cases (n) and percentile (%). The results were evaluated in a confidence interval of 95% and at a significance level of $p < 0.05$.

Findings

A total of 6451 patients were included in the study in accordance with the inclusion criteria. The most frequent occurrences of these applications were in October (n=630) and November (n=680) (Table 1). As a result of

Table 1. Studied patients distribution of the gender and the history of Lodos wind by months

		Sex			
		Male		Female	
		Lodos Existance		Lodos Existance	
		Not Available	Available	Not Available	Available
		n	n	n	n
Months	January	147	23	254	42
	Fabruary	127	26	261	47
	March	176	14	340	19
	April	124	12	270	13
	May	174	23	341	34
	June	195	14	350	29
	July	157	0	358	0
	August	202	0	422	0
	September	177	6	395	16
	October	207	0	423	0
	November	159	50	386	85
	December	91	30	169	63

the conducted analysis, it was determined that the normal distribution of the obtained data was not appropriate. The median age of the patients who were included in the study was 37 (IQR 29-47). While the median age of the male patients was 37 (IQR 28 - 48), it was seen that the median age was 40 (IQR 31 - 50) in female patients. These age values were found to be the same as with the patients on days with Lodos Wind (Figure 1).

In our study, wind speed, Lodos availability, humidity and temperature data were recorded. The obtained daily temperature, humidity and wind speeds according to the patient's application dates; the temperature median 15.1°C (IQR 10.0-21.8); the median humidity value was 76.0 (IQR 66.5-84.1) and the median wind speed was 31km/h (IQR 24-42).

A total of 546 patient admissions (8.5%) were made at the days of Lodos wind. In our study, it was found that 66.9% (n = 4317) of the patients were female. The rate of female patient application was 67.21% on the days when there was no wind, whereas this rate was 63.4% on the days when the wind existed. Our study revealed whether the Lodos wind exists or not during the day, female patients made more applications and it was determined that there was no statistically significant relationship between the presence of wind and the gender of the patients. It was found that there was a statistically significant relationship between the number of applications in the days when the Lodos wind's existed and the wind speed. (Chi-square test, p = 0, 000). Another significant result is the applications of elderly patients increased with an increase in the wind velocity. (One way ANOVA, p = 0,02) (Figure 2) Accordingly, when the wind speed range is grouped as 0-29 km/h, 30-59 km/h, 60-89 km/h and 90 km/h, the age averages corresponds as follows; 39,05±12,92 (95% GA 38,62-39,54), 38,80±13,02 (95% GA 38,32-39,28), 41,67±14,62 (95% GA 39, 61-41,03), 39,55±13,95 (95% GA 38,08-41,03). In the analysis performed, the mean age of patients aged 0-29 (age in years!)and those at 30-59 did not have any statistically significant difference (Tukey test, p = 0,856). It was determined that the average age of 60-89 was more statistically different than those in the range of 30-59 and 0-29. (Tukey test, p = 0.016 and p = 0.036). In contrast to these results, no significant difference was found between age, humidity and temperature value. However, the most frequent applications made on the wind speed interval of 0-29 km/h for both Lodos and the other winds when we consider them as two separate wind groups. The number of applications for this interval was 2765 (47.3%) and 261

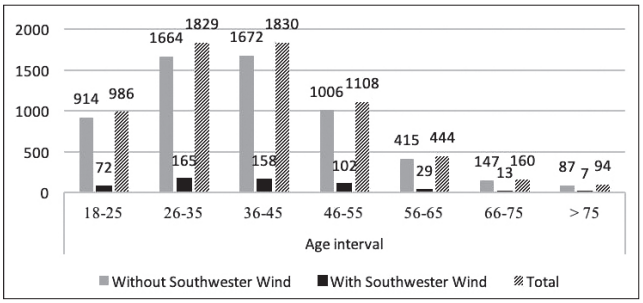

Figure 1. Number of patients in different age groups by Lodos wind presence

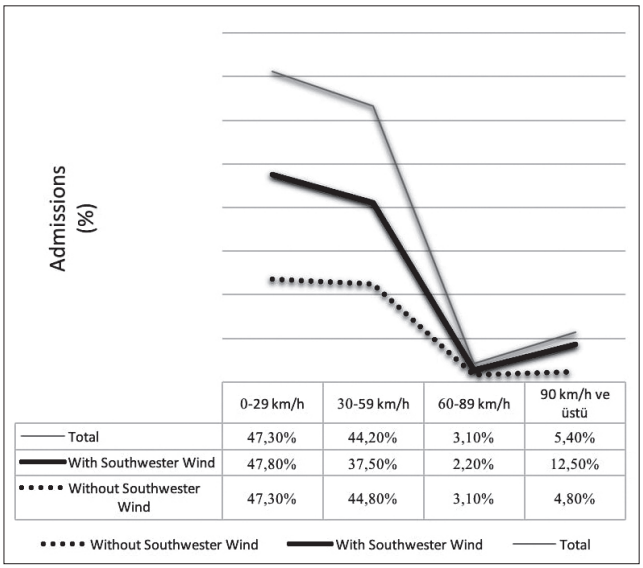

Figure 2. Number of applicants distribution by wind speed

(47.8%) respectively. In terms of percentage difference, the most obvious difference was found in the group with faster wind speeds of 90 km/h. The number of applications was 12.5% (n = 68) on days with Lodos wind with this speed range, whereas this value was 4.8% (n = 278) on other days of the same wind severity.

Discussion

Human beings have shaped and adapted themselves to create shelter, food and energy production that are generally in accordance with the climate and environmental conditions for centuries (1). Nevertheless, during this whole weather and climate events; continued to be blamed for the development of health complaints. For this purpose, "headache" complaints are reported by different scientists in different geographical areas with meteorological parameters due to general atmospheric circulation that may affect hospital applications (4). Our study is important for the investigation of these air events and their relationship to headache development.

In a retrospective study conducted in Turkey, it has been reported that there was an increase in migraine caused emergency applications together with high temperatures and low humidity. In the same study, there was no significant relationship between moon phases and patient admission (5).

In 2000, a study was conducted by Cooke and his colleagues, in order to investigate the effect of Chinook winds on migraine. In this study, it was identified there was an increase in migraine application both on days when Chinook is effective at peak speed and before chinook days but no identified pathophysiology has been shown (6). In a retrospective study of the 1996, which was conducted before this study, it was observed that Santa Ana winds triggered asthma (7). It is important to determine the age-related course in terms of risk development of headache in the lodos state obtained from our research. This is a supplementary contribution to these studies which show the effects of the wind.

In our study, no relationship was found with humidity or temperature values in headache-related applications. At the same time, this difference may be caused by counting all other primary headaches, including the diagnosis of "migraine" in our study. However, there seems to be a need for a new and detailed study in particular for the "migraine" subtype.

Hoffman and his colleagues identified migraine cases as being related to meteorological data that were examined retrospectively; atmospheric pressure, mean temperature and humidity values were being examined but different trigger factors of each migraine patients have limited the study (8).

In a prospective study which includes 238 migraine cases were investigated for air exchange, pressure, temperature and wind speed parameters were examined and a significant relationship was found between air changes and attack frequency (9).

In a study of cluster-type headaches in relation to temperature changes, cluster-type headaches are more frequent in the winter months, more sensory variation in subtropical regions than in tropical regions, and both hot and cold air have specific different effects on cluster-type headache patients (10).

Our study is important in terms of adding the partial effect of the age factor to these results in the literature. Because a statistically significant relationship was found between the age of the applicants with primary headache and the temperature value. However, our study also has limitations on being influenced by advanced age and wind. Because, in this retrospective study, it is not possible to determine how many patient applicants are exposed to the open air and directly exposed by the weather conditions. Detecting that the patients are in an open or closed environment may also improve the analysis of weather-related primary headaches.

In a study conducted in Canada, 15,506 pre-diagnosed patients with depression were examined. A significant relationship was found between the rate of carbon dioxide and sulfur dioxide gas in the air and the emergency admission of depressed patients. In the same study, a significant increase in suicide rates was also observed with air pollution (11).

According to our work, female patients made a higher number of primary headache applications than male patients on the days of the Lodos wind or without Lodos wind. Although, we have found that there is no statistically significant relationship between Lodos wind and gender, the frequency of headache in women is higher than men in all cases, which seems to be an important investigative issue.

Conclusion

Approximately one out of five patients admitted to emergency services is due to headache. When some headaches are recognized and treated early, both serious complications are avoided and emergency department applications are reduced. Our study includes signs of advance prediction for one of the headache types (diagnosed in)emergency department admissions. It is possible that these signs are significantly and statistically supported by well-planned prospective studies and fewer limitations.

There is no conflict of interest between the authors.

The authors declare that there is no conflict of interest regarding the publication of this article.

References

1. Türkeş M. Weather, climate, severe weather events and global warming. General Directorate of State Meteorology Affairs 2000 Year Seminars, Technical Presentations, Series of Seminars: 1: 187-205, Ankara.
2. Şahin K, Bağcı HR. A sinoptic climatology of Lodos in Turkey (a case of Samsun province) Uluslararası Sosyal Araştırmalar Dergisi. 2015;8:413-22.
3. Çöleri M, Yayvan M, Deniz A., Turgut Ü, Eryılmaz A, Geçer C, at all Air Analysis and Forecasting Technique. Ministry and Forestry of Environment General Directorate of State Meteorology Affairs, DMİ publications, 2007. yayın no: 2006-1, Ankara
4. Yaman M, Oruç S. Headaches and Preventable Emergency Situations Presented with Headache. Türkiye Klinikleri J Neurol-Special Topics. 2016;9:32-7.
5. Yılmaz M, Gurger M, Ateşçelik M, Yıldız M, Gürbüz S. Meteorologic parameters and migraine headache: ED study. American Journal of Emergency Medicine 2015;33:409–13. [CrossRef]
6. Cooke LJ, Rose MS, Becker WJ. Chinook winds and migraine headache. Neurology. 2000;54:302. [CrossRef]
7. Corbett SW. Asthma exacerbations during Santa Ana winds in southern California. Wilderness and Environmental Medicine. 1996;4:304-11. [CrossRef]
8. Hoffmann J, Schirra T, Lo H, Neeb L, Reuter U, Martus P. The influence of weather on migraine – are migraine attacks predictable? Annals of Clinical and Translational Neurology 2015; 2:22-8. [CrossRef]
9. Zebenholzer K, Rudel E, Frantal S, Brannath W, Schmidt K, Wöber-Bingöl C, et al. Migraine and weather: A prospective diary-based analysis. Cephalalgia. 2011 Mar;31:391-400. [CrossRef]
10. Lee YJ, Chen YT, Ou SM, Li SY, Yang AC, Tang CH, et al. Y-Jung Lee6.6Temperature variation and the incidence of cluster headache periods: A nationwide population study Cephalalgia. 2014;34:656-63. [CrossRef]
11. Scyszkowicz M. Ambient air pollution and daily emergency department visits for headache in Ottawa, Canada. Headache. 2008;48:1076-81. [CrossRef]