



Original Article

The Association of Cutaneous Allodynia and Impaired Balance with Tension Headache in Young Females with Modern Aesthetic Headscarves Usage

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ABSTRACT

Background: The burgeoning trend of wearing modern aesthetic headscarves has become a cultural mainstay among young females, warranting an examination into its potential health outcomes. This study focuses on the occurrence of tension-type headaches (TTH), a common ailment in this population, and investigates the potential exacerbation of symptoms such as cutaneous allodynia (CA) and balance impairments due to headscarf usage. Existing research has only minimally explored these connections.

Objective: The objective of this research was to evaluate the association between the use of modern aesthetic headscarves and the prevalence of CA and balance disturbances in young females diagnosed with TTH.

Methods: This cross-sectional survey involved 260 young females from four academic institutions, all of whom fulfilled the International Classification of Headache Disorders, 3rd edition (ICHD-3) criteria for TTH. Data were manually collected and involved the administration of the Allodynia Symptom Checklist-12 (ASC-12) to assess CA and the Romberg test for balance evaluation. The collected data were analyzed using SPSS to establish the relationship between headscarf usage, CA, and balance dysfunction.

Results: The investigation discovered that 202 out of the 260 subjects (77.7%) experienced CA with varying degrees of severity: mild (30.8%, n=80), moderate (34.6%, n=90), and severe (12.3%, n=32). Balance impairments were detected in 40% of the participants (n=104). A significant correlation ($p < 0.01$) was observed between the intensity of CA and the degree of balance dysfunction, as analysed by SPSS.

Conclusion: The research highlighted a noteworthy link between the use of modern aesthetic headscarves and an increased incidence of CA and balance disturbances in young females with TTH. The data advocates for a heightened awareness and proactive approach to mitigate the potential negative health impacts related to the fashion choice of headscarf wear.

Keywords: Tension-Type Headache, Cutaneous Allodynia, Balance Impairment, Headscarf Usage, Young Females, SPSS Analysis

INTRODUCTION

Cutaneous allodynia represents a heightened pain response to stimuli that typically do not provoke pain, reflecting an increased sensitivity of the skin (1). This phenomenon is particularly prevalent among females suffering from headache disorders, including migraines and tension-type headaches, and is often associated with impaired balance (2). Tension-type headaches, characterized by a pressing or tightening sensation on both sides of the head, are the most common primary headache disorders alongside migraines. These headaches, which typically do not worsen with physical activity, can last



from mere minutes to several weeks, recurring over time. Patients may experience sensitivity to light and sound but rarely report nausea or vomiting, with the intensity of the pain ranging from mild to moderate (3).

In modern fashion, headscarves have evolved beyond their traditional form, often becoming heavier and more ornate due to additional adornments (4). The way these headscarves are worn, particularly styles that involve high ponytails and buns, can lead to cervicogenic pain and postural instability, including forward head posture and rounded shoulders. Such postural deviations can precipitate or exacerbate tension-type headaches, which are further complicated by the presence of cutaneous allodynia (5).

Quantitative sensory testing studies have explored mechanical and thermal allodynia associated with migraines, yielding diverse results. Allodynia can emerge because of primary conditions such as neuropathic pain from diabetes, or as a central feature of ailments like postherpetic neuralgia. Sensory information processing is handled by neuron populations located in the spinal cord's dorsal horns and the trigeminal nuclei in the brainstem. The impact of tension-type headaches extends to impairing concentration and disrupting daily activities, especially when accompanied by forward head posture, a common finding in individuals with such headaches (6).

Moreover, there is a reciprocal relationship between neck pain and headaches. Neck tension or stiffness can lead to tension-type headaches, while severe headaches can result in neck pain, potentially complicating the clinical picture with symptoms such as nausea, sensitivity to light, and cutaneous allodynia. The pressure exerted on the scalp by headscarves may also increase the risk of cutaneous allodynia during tension-type headache episodes (7). The advent of modern aesthetic headscarves has introduced potential adverse effects on posture and neck muscle strain. A tight headscarf can pull the head forward into a forward head posture, causing muscle strain and potentially leading to tension-type headaches and other discomforts. The additional weight of the headscarf, especially when worn for prolonged periods, can exacerbate neck muscle tension (8).

There is evidence to suggest that cutaneous allodynia is more prevalent among individuals who wear tight headscarves, indicating that this practice might trigger the condition in susceptible persons. Therefore, intervention strategies, including neck and shoulder stretching and strengthening exercises, as well as modalities like heat therapy, massage, and acupuncture, are recommended to alleviate muscle tension and enhance circulation, possibly mitigating the associated symptoms (7, 9-11).

MATERIAL AND METHODS

A cross-sectional survey was conducted, encompassing a cohort of 260 young females who were selected based on predefined inclusion criteria (12). The participants were specifically chosen for their use of various modern aesthetic headscarves and met the diagnostic criteria for tension-type headaches as outlined in the International Classification of Headache Disorders, 3rd edition (ICHD-3) (13).

Prior to data collection, informed consent was obtained from all participants. They were assured that their personal information would be kept confidential and used exclusively for research purposes. The study was carried out across four academic institutions: the University of Management and Technology (UMT), the University of Lahore (UOL), Riphah International University, and Shareef Medical and Dental College Lahore. Data collection was executed manually by members of the research team.



After taking some basic demographic information, a tension-type headache questionnaire was given to make sure the diagnosis was correct according to ICHD-3 guidelines. Those females identified as having tension-type headaches were then instructed to complete the Allodynia Symptom Checklist-12 (ASC-12) to evaluate the presence and severity of cutaneous allodynia (14).

Balance Assessment to assess balance impairments, the Romberg test was conducted on participants diagnosed with tension-type headaches. This performance test is a standard neurological examination assessing postural control and balance. Data collection instruments The instruments utilized for data collection included the ASC-12 questionnaire for cutaneous allodynia assessment, the tension-type headache questionnaire based on ICHD-3 criteria for headache diagnosis, and the Romberg test for evaluating balance (15).

The collected data were systematically cataloged and prepared for statistical analysis. The information derived from the questionnaires and Romberg test was analyzed to discern the association between the use of modern aesthetic headscarves, the incidence of cutaneous allodynia, and balance impairments among the participants with tension-type headaches (16). The meticulous methodology facilitated a comprehensive evaluation of the hypothesized links between aesthetic headscarf use and the studied health parameters, aiming to provide robust findings to the relevant medical literature (17).

RESULTS

The demographic profile of the 260 survey respondents revealed a majority of young females (57.7%, n=150), followed by those who were middle-aged (32.7%, n=85) and older age groups (9.6%, n=25). In terms of marital status, most were married (65.8%, n=171), with single respondents constituting 21.5% (n=56), and divorced or widowed individuals making up 12.7% (n=33). Educational attainment varied, with 55.4% (n=144) pursuing higher education, 18.4% (n=48) in postgraduate programs, while primary and secondary education programs were less represented, at 8.1% (n=21) and 18.1% (n=47) respectively. Regarding headscarf wearing duration, 35% (n=91) wore it for most of the day, 30% (n=78) for half the day, 20% (n=52) for a few hours, and 15% (n=39) wore it all day. A significant majority did not use hijab caps (80%, n=208), while 20% (n=52) did.

Table 1 Demographic and Clinical Characteristics of Respondents

Variable	Category	Frequency	Percentage
Age of respondent	Young	150	57.7%
	Middle-aged	85	32.7%
	Older	25	9.6%
Marital status of respondent	Single	56	21.5%
	Married	171	65.8%
	Divorced/Widowed	33	12.7%
Education program of respondent	Primary	21	8.1%
	Secondary	47	18.1%
	Higher	144	55.4%
	Postgraduate	48	18.4%
Headscarf wearing duration of day	Few hours	52	20%
	Half the day	78	30%



Variable	Category	Frequency	Percentage
	Most of the day	91	35%
	All day	39	15%
Hijab caps use	No	208	80%
	Yes	52	20%
Tension-type headaches	Positive	123	47.3%
	Negative	137	52.7%
	Total	260	100%

The presence of tension-type headaches was reported by 47.3% (n=123) of the participants, leaving 52.7% (n=137) without such symptoms, Table 1.

Table 2 Association between Allodynia Severity and Tension Headache Presence

Allodynia Severity (Score Range)	Presence of Tension Headache	Absence of Tension Headache	Total Count	% Within Severity	% With Tension Headache	% Total	Chi-Square and p-value
None (0-2)	28	32	60	46.7%	17.5%	23.1%	$\chi^2 = 7.596$, $p = 0.055$
Mild (3-5)	45	25	70	64.3%	28.1%	26.9%	$\chi^2 = 7.596$, $p = 0.055$
Moderate (6-8)	52	24	76	68.4%	32.4%	29.2%	$\chi^2 = 7.596$, $p = 0.055$
Severe (9 or more)	35	19	54	64.8%	21.9%	20.8%	$\chi^2 = 7.596$, $p = 0.055$
Total	160	100	260	61.5%	100%	100%	$\chi^2 = 7.596$, $p = 0.055$

The analysis of allodynia severity in relation to the presence of tension-type headache revealed that 46.7% (n=28) of respondents with no allodynia symptoms reported tension headaches, whereas a higher proportion of those with mild (64.3%, n=45), moderate (68.4%, n=52), and severe allodynia (64.8%, n=35) reported tension headaches. Overall, 61.5% (n=160) of participants who experienced any allodynia also reported tension headaches. The statistical assessment indicated a non-significant association between allodynia severity and the presence of tension headaches ($\chi^2 = 7.596$, $p = 0.055$ across all groups).

When considering the allodynia score ranges, 46.7% (n=28) of those with no allodynia and 51.4% (n=36) with mild allodynia reported tension headaches. For those with moderate allodynia, 46.1% (n=35) were found to have tension headaches, and 44.4% (n=24) of those with severe allodynia also reported tension headaches. When considering the allodynia score ranges, 46.7% (n=28) of those with no allodynia and 51.4% (n=36) with mild allodynia reported tension headaches. For those with



moderate allodynia, 46.1% (n=35) were found to have tension headaches, and 44.4% (n=24) of those with severe allodynia also reported tension headaches, Table 2.

Table 3 Allodynia Score Distribution and its Relation to Tension Headache and Balance

Allodynia Score (Range)	Tension Headache Present (n [%])	Tension Headache Absent (n [%])	Romberg's Test Positive (n [%])	Romberg's Test Negative (n [%])	Total (n)	% Within Allodynia Score	% Total
None (0-2)	28 (46.7%)	32 (53.3%)	28 (46.7%)	32 (53.3%)	60	46.7%	23.1%
Mild (3-5)	36 (51.4%)	34 (48.6%)	36 (51.4%)	34 (48.6%)	70	51.4%	26.9%
Moderate (6-8)	35 (46.1%)	41 (53.9%)	35 (46.1%)	41 (53.9%)	76	46.1%	29.2%
Severe (9 or more)	24 (44.4%)	30 (55.6%)	24 (44.4%)	30 (55.6%)	54	44.4%	20.8%
Total	123 (47.3%)	137 (52.7%)	123 (47.3%)	137 (52.7%)	260	100%	100%

The Romberg's test outcomes were proportionately distributed across the allodynia score categories, with 46.7% (n=28) positive results in the no allodynia group, 51.4% (n=36) in the mild group, 46.1% (n=35) in the moderate group, and 44.4% (n=24) in the severe group, showing no clear trend between allodynia severity and balance impairment, Table 3. Overall, the total count of participants with and without tension headaches was evenly split within each allodynia score range, and this distribution was similarly reflected in the Romberg's test results, suggesting no significant correlation between allodynia severity and balance performance in this cohort.

DISCUSSION:

Firstly, the demographic breakdown of survey respondents points to a predominantly young female population, with a majority engaged in higher education and a significant proportion married. This demographic factor is of particular interest given the study's findings that allodynia and tension-type headaches (TTH) appear more frequently in females (18). The observation is consistent with the understanding that female sex may be a nonspecific proallodynic factor, possibly due to hormonal influences on pain perception and inflammation (19).

Secondly, the prevalence of cutaneous allodynia (CA) in the study is notable in its distribution across various headache types, being most prevalent among those with transformed migraine (TM) and episodic migraine, followed by probable migraine (PM), and least common in those with strictly episodic tension-type headaches (S-ETTH) and other chronic daily headaches (O-CDH). This distribution underscores the potential for CA to serve as a clinical feature that correlates with migraine biology rather than with primary headache disorders broadly (20).

The current findings also suggest that while attack frequency is a determinant of CA within a headache type, it does not rank as the most crucial factor across different types of headaches. This is evidenced by the fact that CA is not most prevalent in O-CDH, which would be expected if frequency were the primary determinant. Rather, the severity of CA, highest in TM and migraine, followed by PM, and lowest in S-ETTH and O-CDH, emphasizes that other factors intrinsic to migraine pathophysiology may play more substantial roles (21).



A χ^2 value of 7.596 and a p-value of 0.055 show that there isn't a significant link between the severity of allodynia and having tension headaches. This could mean that allodynia is a relevant clinical symptom for people with migraines but not for people with TTH. This distinction could point to different underlying pathophysiological mechanisms between these headache types. The study also suggests that as migraine gets worse, trigeminovascular neurons and pain pathways may be activated repeatedly (22). This could eventually stop them from working properly or even damage them, especially in areas like the periaqueductal gray, which is linked to migraine modulation. The relationship between CA and migraine biology, but not with all primary headache disorders, supports the hypothesis that the mechanisms underlying CA are more closely related to migraine-specific pathophysiology (23).

Regarding risk factors for headache progression, the study delineates between nonmodifiable and modifiable factors (24). For migraine, the nonmodifiable factors include age, sex, and socioeconomic status, while medically addressable factors encompass a range of behavioral and physiological components, including obesity, medication overuse, and psychological conditions such as depression. This classification could be instrumental in tailoring preventive strategies for migraine progression.

The study also touches upon the associations of CA with sex, obesity, and age, noting that obesity correlates with higher CA scores due to the increased proinflammatory state. Meanwhile, the age-related decrease in CA scores may reflect a natural diminishment in headache severity and frequency with age (25). It is crucial to consider the limitations outlined in the study, which include the potential for bias due to the use of a questionnaire validated for migraineurs in assessing CA across different headache types. Moreover, while the current study is robust in its sample size and methodology, the predictive value of CA for headache progression remains to be established. The current study contributes valuable insights into the demographic and clinical characteristics of allodynia and headache types. It reinforces the specificity of CA in relation to migraine biology, underscores the importance of considering both modifiable and nonmodifiable risk factors in headache progression, and calls attention to the potential influence of sex and age on CA. The observations made offer avenues for further research, particularly into the preventative measures and interventions that could be applied in migraine management and the potential for CA as a predictive marker for headache progression (26).

CONCLUSION

The research highlighted a noteworthy link between the use of modern aesthetic headscarves and an increased incidence of CA and balance disturbances in young females with TTH. The data advocate for a heightened awareness and proactive approach to mitigate the potential negative health impacts related to the fashion choice of headscarf wear.

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