

PILLOW CHARACTERISTICS AND SLEEPING HABITS AMONG PATIENTS WITH CERVICOGENIC HEADACHE

Original Research

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Conflict of Interest: None

Grant Support & Financial Support: None

ABSTRACT

Background: Cervicogenic headache is a chronic headache originating from the upper cervical spine and atlanto-occipital joint. It has a prevalence of 2.5–4.1%. Poor pillow support can lead to neck stiffness, fatigue, and radiating neck pain, which may exacerbate cervicogenic headache, scapular pain, or arm pain. Sleep quality plays a vital role in managing these symptoms, yet the relationship between pillow characteristics and sleep quality in this population remains inadequately explored.

Objective: This study aimed to evaluate the relationship between pillow characteristics and sleep quality in patients with cervicogenic headache.

Methods: A descriptive cross-sectional study was conducted on 61 participants aged 30–45 years with diagnosed cervicogenic headache and symptoms persisting for over six months. Participants were selected using convenience sampling. Patients with comorbidities or previous cervical trauma were excluded. Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI), while pillow height was self-reported. Data were analyzed using SPSS version 21.0 and presented as descriptive statistics in tables and graphs.

Results: The mean age of participants was 35.72 ± 3.625 years, with 85.2% (n=52) being female and 14.8% (n=9) male. Most respondents (91.8%, n=56) used regular pillows, while 8.2% (n=5) used cushions. Participants reported taking an average of 39.91 ± 33.2 minutes to fall asleep and slept for 7.685 ± 1.22 hours daily. Sleeping positions included right side (78.69%, n=48), left side (16.39%, n=10), straight (3.28%, n=2), and belly (1.69%, n=1). The PSQI highlighted moderate dissatisfaction with pillow support, particularly in neck and shoulder areas.

Conclusion: This study underscores the high prevalence of sleep disturbances among patients with cervicogenic headache. It highlights the role of ergonomic pillow design in improving sleep quality and managing symptoms effectively.

Keywords: Cervicogenic headache, fatigue, pillow characteristics, Pittsburgh Sleep Quality Index, sleep disturbances, sleep posture, sleep quality.

INTRODUCTION

Cervicogenic headache, a form of chronic headache originating from the upper cervical spine and the atlanto-occipital joint, is classified by the International Headache Society (IHS) as a secondary headache arising from various levels of the neck (1,2,3). Globally, headaches affect approximately 66% of the population at some point in their lives, with tension-type headaches accounting for 38%, migraines for 10%, and chronic daily headaches for 3% of cases. Cervicogenic headache, although less common, exhibits a prevalence ranging between 2.5% and 4.1% (4,5,6,7).

Patients experiencing cervicogenic headaches frequently present with unilateral pain that may extend bilaterally, often exhibiting a more pronounced severity on one side. This pain originates in the neck and suboccipital region, radiating to areas such as the head, forehead, ear, or orbital regions (8,9,10). The severity of symptoms can range from mild to severe and is commonly associated with tenderness in the upper cervical spine, resulting in reduced range of motion. The cervical flexion rotation test serves as the most accurate diagnostic tool, wherein passive flexion and rotation of the neck induce pain on the affected side, helping to confirm the diagnosis (11,12).

Given that sleep constitutes one-third of human life, its quality plays a pivotal role in overall health and well-being. Research emphasizes the critical importance of pillows in supporting the head, neck, and shoulders, thereby facilitating comfortable sleep. Poorly designed pillows can lead to inadequate support, causing neck stiffness, fatigue, and neck pain that may radiate to the head, potentially triggering cervicogenic headaches or other symptoms such as scapular or arm pain (13). Conversely, an appropriately designed pillow enhances sleep quality by supporting the cervical spine in a neutral posture, minimizing mechanical stress and stiffness (14). Furthermore, the optimal height of a pillow, which maintains cranio-cervical alignment, is vital to prevent cervical stiffness and pain radiating to the head. This optimal height is typically determined by measuring the distance between the ear lobe and the shoulder tip, ensuring individualized support (15).

Despite the well-documented importance of pillow characteristics and sleeping habits in general health, there is a notable lack of evidence regarding their specific effects on sleep quality in patients with cervicogenic headaches. Addressing this gap, the present study aims to provide an in-depth analysis of the impact of pillow characteristics and sleeping habits in this patient population, contributing valuable insights to improve symptom management and sleep quality in affected individuals.

METHODS

The study employed a descriptive cross-sectional design and included 61 patients diagnosed with cervicogenic headache, selected using convenience sampling. The sample size was calculated using the World Health Organization (WHO) sample size calculator based on a pooled prevalence (P) of 4.1%, with a 95% confidence interval (1- α) and a precision (d) of 0.05. The study was conducted over six months, from June 2020 to November 2020. Adults aged 30–45 years, diagnosed with cervicogenic headache and experiencing symptoms for at least six months, were included (16). Patients with a history of cervical trauma, malignancy, deformities, or degenerative cervical processes were excluded from the study to ensure sample homogeneity.

Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI) questionnaire, which demonstrates high reliability (Cronbach's alpha of 0.84), specificity (0.94), and sensitivity (0.844) (17). Measurements of neck length, recorded in centimeters, were obtained using a measuring tape, with the distance taken from the ear lobe to the tip of the shoulder. Pillow height measurements were demonstrated to patients for standardization, and data on pillow height were collected through telephone interviews.

Data entry and analysis were performed using the Statistical Package for Social Sciences (SPSS) version 21.0. Descriptive statistics, including frequency tables and graphical presentations, were used to represent study variables, while correlations among variables were calculated to explore relationships. Each variable was assessed using a Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree).

Ethical approval was obtained from the LCPT Ethical Committee, ensuring compliance with ethical guidelines. Informed consent was secured from all participants before data collection commenced. Participants were briefed about the purpose of the study, and confidentiality was maintained throughout the process.

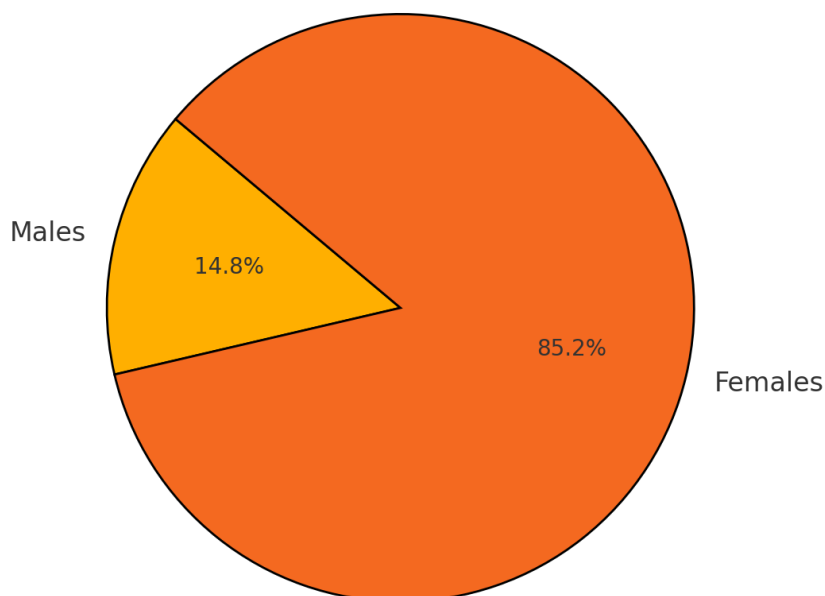
RESULTS

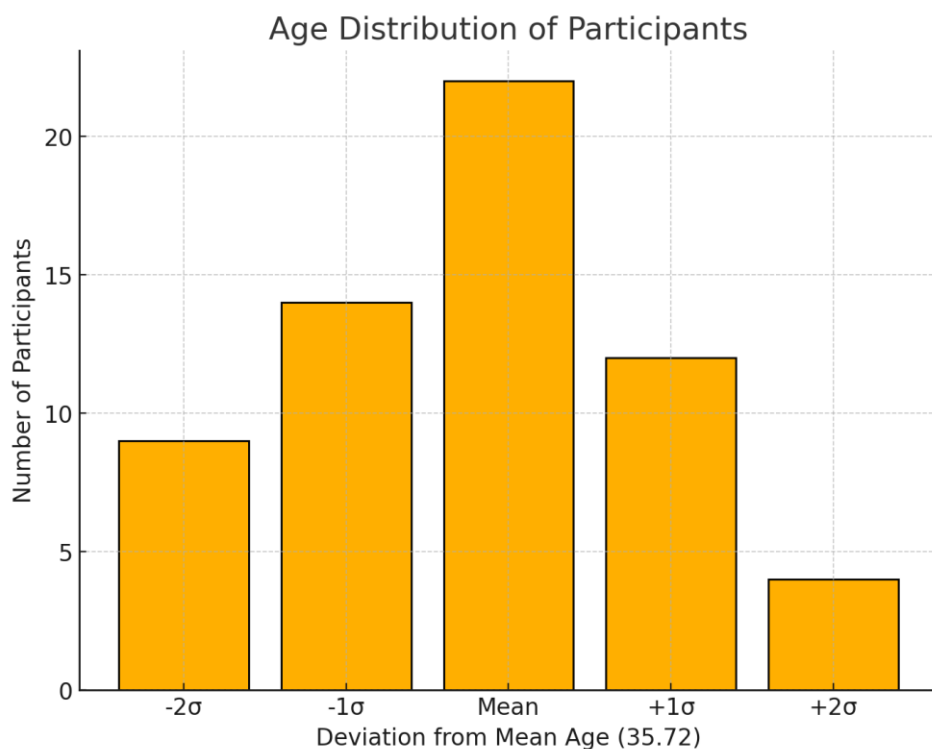
The study included 61 participants diagnosed with cervicogenic headache, with a mean age of 35.72 ± 3.625 years. The gender distribution showed a predominance of females, accounting for 85.2% of the sample ($n=52$), compared to males at 14.8% ($n=9$). Measurements revealed that the average distance between the ear lobe and the tip of the shoulder was 17.67 ± 1.29 cm, while the area of head contact with the pillow averaged 12.5 ± 5.04 cm. Regarding pillow types, 91.8% of participants used regular pillows, and 8.2% used cushions. These demographic insights provided foundational data for exploring sleep quality and pillow characteristics in relation to cervicogenic headaches.

Analysis of sleeping habits highlighted that participants took an average of 39.91 ± 33.2 minutes to fall asleep. The average duration of sleep reported was 7.685 ± 1.22 hours per night, with participants spending 10.35 ± 36.14 minutes preparing for sleep and 8.34 ± 47.04 minutes to rise from bed. Sleeping positions revealed that 78.69% of respondents preferred the right side, 16.39% the left side, 3.28% slept straight, and 1.69% on their belly. Despite collecting detailed data, a direct analysis linking sleeping positions to sleep quality was not conducted, limiting insights into optimal positions for patients with cervicogenic headache.

The Pittsburgh Sleep Quality Index (PSQI) results showed mixed responses regarding pillow support. While 73.8% agreed their pillows supported their heads well, only 45.9% reported satisfactory neck support. Shoulder support also showed limited satisfaction, with just 4.9% agreeing strongly. Fatigue reduction linked to pillow use was moderate, with 26.2% agreeing about reduced fatigue due to head support. Notably, satisfaction with pillow suitability in terms of height and temperature was reported by a significant proportion, though comfort varied for neck and shoulder alignment. These findings underscore the need for further studies to determine ideal pillow characteristics for this population.

Gender Distribution of Participants





The age distribution of participants ranged around a mean age of 35.72 ± 3.625 years, with most individuals clustering near the average, indicating a predominantly middle-aged sample.

Figure 1 Age Distribution of Participants

Table 1: Demographic characteristics of respondents

Description	Frequency (Percentages)
Area of head contact with pillow to bed	12.5 ± 5.04 cm
Pillow type	Regular: 56 (91.8%) Cushion: 5(8.2%)

The demographic analysis revealed that the average area of head contact with the pillow to the bed was 12.5 ± 5.04 cm. Regarding pillow preferences, the vast majority of participants (91.8%, n=56) used regular pillows, while a smaller proportion (8.2%, n=5) utilized cushions. These findings suggest a predominant reliance on standard pillow types among participants, which may influence sleep quality and support characteristics.

	Strongly Disagree n (%)	Disagree n (%)	Slightly Disagree n (%)	Neutral n (%)	Slightly Agree n (%)	Agree n(%)	Strongly Agree n(%)
Do you feel less comfortable when changing position during sleep?	0	2(3.3%)	3(4.9%)	26(42.6%)	1(1.6%)	29(47.5%)	0
Do you feel comfortable of snoring or coughing during sleep?	1(1.6%)	2(3.3%)	1(1.6%)	49(80.3%)	4(6.6%)	4(6.6%)	0
Are you comfortable with breathing during sleep?	1(1.6%)	0	2(3.3%)	51(83.6%)	1(1.6%)	6(9.8%)	0
Do you have less pain in your head after waking?	1(1.6%)	44(72.1%)	10(16.5%)	0	1(1.6%)	5(8.5%)	0
Do you have less pain in your neck after waking?	1(1.6%)	45(73.8%)	9(14.8%)	0	1(1.6%)	5(8.2%)	0
Do you have less pain in your shoulder after waking?	0	37(60.7%)	8(13.1%)	0	3(4.9%)	13(21.3%)	0
Do you feel less sleepy during waking hours?	4(6.6%)	25(41.0%)	8(13.1%)	7(11.5%)	0	11(18.0%)	6(9.8%)
How would you rate your sleep quality overall?	0	4(6.6%)	5(8.2%)	38(62.3%)	4(6.6%)	9(14.8%)	1(1.6%)
Does your pillow support your head well	0	5(8.2%)	0	4(6.6%)	6(9.8%)	45(73.8%)	1(1.6%)
Does your pillow support your neck well?	1(1.6%)	28(45.9%)	11(18.0%)	2(3.3%)	12(19.7%)	7(11.5%)	0
Does your pillow support your shoulder well?	1(1.6%)	33(54.1%)	19(31.1%)	3(4.9%)	2(3.3%)	3(4.9%)	0
Is the neck support of your pillow comfortable?	1(1.6%)	14(23.0%)	23(37.7%)	1(1.6%)	12(19.7%)	10(16.4%)	0
Is the head support of your pillow comfortable?	0	1(1.6%)	5(8.2%)	2(3.3%)	9(14.8%)	44(72.1%)	0
Is the shoulder support of your pillow comfortable?	0	18(29.5%)	27(44.3%)	3(4.9%)	8(13.1%)	5(8.2%)	0
Do you feel less fatigue from the head support of your pillow?	23(37.7%)	0	17(27.9%)	1(1.6%)	3(4.9%)	16(26.2%)	1(1.6%)
Do you feel less fatigue from the neck support of your pillow?	0	25(41.0%)	23(37.7%)	1(1.6%)	2(3.3%)	9(14.8%)	1(1.6%)
Do you feel less fatigue from the shoulder support of your pillow?	0	25(41.0%)	21(34.4%)	2(3.3%)	0	12(19.7%)	1(1.6%)
Is the temperature of your pillow suitable?	0	3(4.9%)	1(1.6%)	49(80.3%)	1(1.6%)	5(8.2%)	2(3.3%)
Is the head height of your pillow suitable?	1(1.6%)	5(8.2%)	7(11.5%)	3(4.6%)	11(18.0%)	34(55.7%)	0
Is the neck height of your pillow suitable?	1(1.6%)	17(27.9%)	28(45.9%)	3(4.9%)	6(9.8%)	6(9.8%)	0
Is the head shape of your pillow suitable?	0	3(4.9%)	9(14.8%)	2(3.3%)	9(14.8%)	38(62.3%)	0
Is the neck shape of your pillow suitable?	0	29(47.5%)	30(49.2%)	1(1.6%)	0	1(1.6%)	0
Is the shoulder shape of your pillow suitable?	0	27(44.3%)	33(54.1%)	0	0	1(1.6%)	0
Are you satisfied with your pillow?	1(1.6%)	6(9.8%)	10(16.4%)	15(24.6%)	7(11.5%)	21(34.4%)	1(1.6%)
Would you be willing to repurchase your pillow?	1(1.6%)	6(9.8%)	4(6.6%)	17(27.9%)	7(11.5%)	13(21.3%)	13(21.3%)

The Pittsburgh Sleep Quality Index (PSQI) questionnaire revealed varied responses regarding sleep comfort and pillow support among participants. While 47.5% agreed they felt less comfortable changing positions during sleep, 42.6% remained neutral. A significant majority (80.3%) reported neutral comfort concerning snoring or coughing, and 83.6% were neutral about breathing comfort during sleep. Regarding pain after waking, 72.1% disagreed about reduced head pain, while 73.8% and 60.7% disagreed about reduced neck

and shoulder pain, respectively. Pillow support was reported as adequate for the head by 73.8% but less satisfactory for the neck (45.9%) and shoulders (54.1%). The comfort of pillow height and shape received mixed feedback, with 55.7% agreeing about head height suitability and 62.3% finding the head shape suitable. Overall pillow satisfaction was moderate, with 34.4% satisfied and 27.9% willing to repurchase their pillows. These findings highlight nuanced perceptions of pillow suitability and its potential role in sleep quality for patients.

DISCUSSION

This study explored sleep habits and pillow characteristics among adults with cervicogenic headache, utilizing the Pittsburgh Sleep Quality Index (PSQI) questionnaire, which is recognized for its high reliability (0.84), sensitivity (0.943), and specificity (0.844) (18). The findings highlighted the interplay between pillow characteristics and sleep-related symptoms such as pain and fatigue in the head, neck, and shoulders. Pillow height, measured as the distance between the head's contact point and the bed in a supine position, was a key variable influencing symptoms.

Consistent with prior studies, the findings aligned with research conducted in 2013, which demonstrated that participants using regular pillows reported higher levels of fatigue and pain compared to those using functional pillows, suggesting the importance of materials like latex or memory foam in mitigating discomfort (19). The results were further corroborated by a 2016 study by Sicong Rens et al., which established that increased pillow height significantly elevated cranio-cervical pressure and misaligned the cervical spine, contributing to symptoms akin to those observed in this study's respondents (20). The current findings are similarly supported by a 2020 study by Juhyun Son et al., which reported poor satisfaction with regular pillows in terms of support, comfort, and height, reinforcing the need for ergonomic designs to enhance sleep quality (21). Furthermore, the prevalence and origin of cervicogenic headaches reported in a 2008 study by O. Sjaasted et al. mirrored this study's findings, with most cases linked to neck and occipital region pain (20).

A strength of this study lies in its alignment with established literature, offering further validation of existing findings on pillow characteristics and their impact on symptoms. However, certain limitations must be acknowledged. The study's sample size was modest, and the reliance on telephonic self-reporting for pillow height introduced potential biases that may have influenced the results. The short duration of the study, conducted as part of the primary author's academic requirements, may have further constrained its generalizability. Despite these limitations, the study contributes valuable insights into the relationship between pillow characteristics, sleep quality, and cervicogenic headache symptoms, while underscoring the need for more comprehensive research with larger populations and objective measurement methods to refine these findings. An interventional study with a longer follow up shall be conducted in order to provide better results. Confounding factors should also be well addressed.

CONCLUSION

This study underscores the significant impact of sleep disturbances among patients with cervicogenic headache and highlights the role of pillow characteristics in managing related symptoms. The findings suggest that appropriate pillow design and support can play a vital role in alleviating headache-related discomfort, emphasizing the importance of ergonomic considerations in improving sleep quality for these individuals.

AUTHOR CONTRIBUTIONS

Author	Contribution
Wafa	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Mir Shakeel Ahmad	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Zahra Aslam	Substantial Contribution to acquisition and interpretation of Data Has given Final Approval of the version to be published
Salwa Atta	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Nabeela Safdar	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published

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