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THE RELATIONSHIP BETWEEN SLEEP POSTURE AND CERVICOGENIC HEADACHE AND ITS IMPACTS ON SLEEP QUALITY

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Abstract

BACKGROUND

A secondary headache caused by dysfunction of the cervical spine and related structures is called cervicogenic headache (CGH). It is generally linked to posture related stress and musculoskeletal strain. Maintaining cervical alignment is mostly dependent on sleep posture, and incorrect positions can put more mechanical strain on the neck. Understanding the relationship between CGH and sleep posture, as well as their impact on sleep quality, is critical for clinical practice.

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OBJECTIVE

The primary objective of the study was to investigate relationship between sleep posture and severity of cervicogenic headache symptoms while the secondary objective was the impact of cervicogenic headache on sleep quality.

METHODS

This was a cross sectional study. This study was carried out among 87 diagnosed patients of Cervicogenic headache both male and female of the age 25 to 50 in Helping Hand Institute of Rehabilitation Sciences, Mansehra using non probability convenience sampling technique. The study was conducted in four months. The data was collected through self-structured questionnaire and was analyzed through SPSS version 22.

RESULTS

A total n=86 with mean ± SD: 1.87 ± 0.865. A relationship between sleep posture and the start of cervicogenic headaches was revealed by cross-tabulation analysis. The right lateral sleep position showed a dual effect: when used regularly, it was linked to an increase in headaches, but when utilized purposefully, it relieved symptoms. Likert scale analysis revealed that while sleep length was often sufficient, participants frequently had trouble falling asleep and had sleep interruptions, indicating poor sleep quality.

CONCLUSION

The findings indicate that sleep posture has a major influence on pain originating from the neck accompanied by headache and that it also affects the quality of sleep. Importantly, the right lateral sleep position shows a dual effect, as it helps to relieve symptoms when it is properly adjusted but is associated with aggravation of the headache when it is kept as a habitual one. Moreover, the presence of sleep disorders despite the adequacy of sleep duration points to the need for dealing with ergonomic sleep behavior and sleep quality as indispensable factors in the treatment of cervicogenic headaches.

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INTRODUCTION

A type of headache called cervicogenic headache (or CGH) happens when the pain starts in the upper part of your neck and the joint at the back of your head. The pain can be felt in different parts of your head or face. Usually, the pain begins on one side of head and neck, but sometimes it can spread to the other side. The pain comes from the muscles or bones in neck, and that's why it's called a "neck-related" headache.[1] Early in the 1980s, Norwegian neurologist Ottar Sjaastad identified cervicogenic headache as a unique kind of headache that worsened with movements of the head and neck. [2] A set of clinically relevant diagnostic criteria has also been developed by the Cervicogenic Headache International Study Group (CHISG), and it includes ipsilateral shoulder and arm discomfort, limited cervical range of motion (ROM), and pain with neck movement or prolonged incorrect placement.[3]

People with persistent headaches sometimes experience sleep disruptions which is an essential for physiological function for both physical and mental well-being.[4] Sleep is a vital part of our existence and one of the basic necessities of a person, and its problems are a big clinical concern. Almost 50% of the population suffers from various types of sleep disorders.[5] Sleep position is a potential yet frequently disregarded factor in headache therapy. Cervicogenic headaches may be brought on by or made worse by improper sleeping positions that put tension on the cervical spine.

A variety of sleep metrics, such as Total Sleep Time (TST), Sleep Onset latency (SOL), Sleep Maintenance, Total Wake Time (TWT), Sleep Efficiency (SE), and occasionally sleep disturbing events like spontaneous arousal or apnea, can grouped together under the term "sleep quality," which is prevalent in the field of sleep medicine. In addition to being predictive of musculoskeletal pain in pre-adolescence, adolescents, young adults, and adults without pain, poor sleep quality is also substantially linked to negative health outcomes for adults.[6] Patients with cervicogenic headaches experience either nociceptive, neuropathic or combination of the two types of pain. It is thought that neuropathic pain associated with cervicogenic headaches causes impairments including anxiety, sadness, and sleep disruptions, which eventually lowers the quality of life for those who have them.[7]

A number of regional studies have also recently reported significant prevalence estimates in specific populations, further reinforcing the clinical relevance of CGH in working age adults.[8]

The PSQI and other validated instruments are commonly employed in headache studies to quantify global sleep quality and identify specific sleep disturbances.[9] Diagnosing CGH can be difficult because it has characteristics with tension type headaches and migraines. Usually, imaging reveals no particular disease. While some studies indicate that cervical manipulation and nerve stimulation may be beneficial, traditional headache medicines are often useless.[10]

Aslam et al. (2024) analyzed the association between the prevalence of adult cervicogenic headaches, the quality of sleep, and disruptions in the sleep patterns. The study revealed that "poor quality sleep, when compounded by cervical straining sleeping habits, can exacerbate the problem of cervicogenic headaches."[11]

If sleep posture contributes to nocturnal cervical loading and CGH, then simple, inexpensive, and non-invasive strategies, such as personalized pillow prescription, education in sleep position optimization (e.g., supine with neutral cervical support or side-lying with appropriate pillow height), and selective cervical stabilization/strengthening programs, may represent useful adjuncts in CGH rehabilitation.[12] Exercise programs targeting cervical stabilization or multimodal physiotherapy have demonstrated reductions in headache frequency, improvements in cervical posture, and improved sleep quality in randomized controlled trials.[13] To improve the prognosis and prevent the occurrence of CGH in patients with chronic neck pain, the research suggests that both physical and psychological aspects should be considered.[14]

Physical and manual modes of therapy are important therapeutic modalities for the acute rehabilitation of cervicogenic headache.[15] Physiotherapy plays a major role in the reduction of CGH symptoms and a better quality of life through procedures that promote joint mobility, reduce muscular tension, and correct posture.[16]

The International Headache Society has formally recognized it, yet specialists continue to disagree on its diagnosis. This study addresses the scientific and clinical data pertaining to cervicogenic

headache, the difficulties in identifying and diagnosing it, and suggests evidence-based and pragmatic methods for efficient diagnosis and treatment.[17]

One of the biggest challenges in figuring out how the cervicogenic headache (CGH) works is to understand the connection between the way you sleep and the origin or the increase of the CGH symptoms. Especially if certain sleeping positions can lead to more cervical spine stress, thus causing or worsening CGH, finding out about this link would be a great help to healthcare professionals in advising patients on how to sleep and in giving them ergonomic sleeping tips. The present study intends to improve the quality of sleep for people with CGH by figuring out which ways of sleeping may have a beneficial effect or, on the contrary, may make the situation worse.

METHODS AND MATERIAL

After the approval of synopsis this research was conducted in helping hand institute of rehabilitation sciences Mansehra in four months. This study was conducted through cross sectional survey in which Non probability, convenient sampling technique was used. G*Power[18] was used to compute our sample size, which turned out to be 86. Included patients varied in age from 25 to 50 years. Both male and female gender who were diagnosed with cervicogenic headache. Informed consent was also taken from each participant. On the other hand, Patients suffering from primary headache diseases, diagnosed mental illnesses, recognized neurological disorders, those who take pain killer were excluded from the study.

DATA COLLECTION PROCEDURE

The data was collected using a non-probability convenient sampling method from patients diagnosed with cervicogenic headache (CGH) at the Helping Hands Institute in Mansehra. Participants were first informed about the study, including its objectives and procedures, and their written consent was obtained before participation. Data collection involved the supervised administration of self-structured questionnaires, along with clinical and demographic information. All data were securely

stored, and regular checks were performed to ensure completeness and accuracy. This process ensured that the data were collected, organized, and managed systematically and ethically.

DATA ANALYSIS

Data was assessed on SPSS version V22 [19] result was drawn through applying an appropriate statistical analysis. For continuous data mean and standard deviation were calculated. While categorical variables like gender is presented in term of frequency and percentages. To examine the association between duration of CGH, sleep latency and perceived relationship of sleep posture and headache onset and sleep position reported to relieve pain was assessed using cross tabulation.

RESULTS

Descriptive analysis of sample n=86 of cervicogenic headache patient with mean± standard deviation of 1.87±0.865. A connection between preferred sleep posture and the onset of headaches was revealed by cross-tabulation analysis. The right lateral sleep position showed a twofold effect: when used regularly, headaches were reported to worsen, but when the same posture was purposefully changed while you slept, symptoms were reported to worsen, but when the same posture was purposefully changed while you slept, symptoms were reported to improve. Additional cross tabulation revealed that postural adjustments during sleep were frequently used to alleviate headache symptoms, with right lateral adjustments being reported as successful. Quality of sleep was assessed using a Likert scale. The majority of participants reported adequate sleep hours.

Overall, the findings indicate that while postural changes during sleep are linked to symptom relief in those with cervicogenic headaches, habitual sleep posture and poor sleep quality may play a role in the initiation of headaches.

Below table shows the age categories of participants, 38 participants lie in age category of 25-34 21 lies between 35-44 and 27 lies between 45-50, with the mean standard± deviation of 1.87±0.865.

Table 1: Demographics of age, their frequencies, percentages and mean standard deviation.

VARIABLES	CATEGORIES	FREQUENCY AND PERCENTAGES	MEAN±STD
Age in categories	25-34 35-44 45-50	38(44.2) 21(24.4) 27(31.4)	1.87±0.865

According to table number 2, 75 participants said they use one pillow, 6 said two pillows and 3 said they use more than 2 pillows. 28 participants used memory foam,12 used orthopedic pillow,36 used feather pillows, and 10 participants said they use cotton pillows.

Table 2: Frequency distribution of type of pillow used by participants

Type and number of pillows	Frequency	Percentage
Memory foam	28	32.6%
Orthopedic	12	14.0%
Feathers	36	41.9%
Cotton	10	11.6%
One	75	87.2%
Two	6	7.0%
More than two	3	3.5%
No pillow	2	2.3%

According to table number 3, 20 participants sleep in prone position,17on left lateral, 30 in right lateral, 14 in supine position while 5 said they adopt mixed/variable position.

Table 3: Frequency distribution of participants by preferred sleeping position

preferred sleep position	Frequency	Percentage
Prone (on stomach)	20	23.3
Left lateral(side)	17	19.8
Right lateral	30	34.9
Supine (back)	14	16.3
Variable /mixed	5	5.8

According to table 4, 74 participants said that they have observed relationship between sleep posture and cervicogenic headache while 12 said they do not observe any relationship between them.

Table 4: Distribution of headache onset in relation to sleep posture

Sleep posture and headache onset	Frequency	Percentage
Yes	74	86.0%
No	12	14.0%

According to below table 5,11 participants pain relief in prone position,8 in left latera,29 in right lateral 17 in supine, while 21 relief pain in variable position.

Table 5: Distribution of pain relief according to sleep position.

Position to relieve pain	Frequency	Percentage
Prone	11	12.8%
Left lateral	8	9.3%
Right lateral	29	33.7%
supine	17	19.8%
Variable /mixed	21	24.4%

According to the data analysis of this study, 28 participants have CGH from less than 6 months,22 have CGH from 6-12 months,25 from 1-2 years and 11 said that they have CGH from more than 2 years. Their severity ranges from mild (4), moderate pain (28), while 54 have severe pain.

Another important analysis showed that 41 participants have sleep latency of 0-15 mins, 21 have 16-30 mins, and 22 have 31-60mins while only 2 have more than 60 mins.

To assess the amount and quality of sleep, participants were asked about sleeping hours, 30 participants stated that they have less than 6 hours of actual sleep, 47 have 6-8 hours of sleep while 9 participants have more than 8 hours of sleep.

According to table 6, 7 participants said that they have over all good sleep quality, 33 have fairly good, 39 have fairly bad while 7 said they have very bad sleep quality.

Table 6: Distribution according to overall sleep quality

Overall Sleep quality	Frequency	Percentage
Very good	7	8.1%
Fairly good	33	38.4%
Fairly bad	39	45.3%
Very bad	7	8.1%

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According to table below, the data demonstrates that headache onset was recorded in all sleep positions, with lateral and prone sleeping positions showing higher frequency than the supine position, suggesting a potential correlation between sleep posture and headache onset.

Table7: Cross tabulation between preferred sleep position and relation Between sleep posture and headache on set

		Do u observe a Relationship between your sleep posture and headache onset?		Total
		YES	NO	
PREFFERED SEEP POSITION	Prone	18	2	20
	Left lateral	17	0	17
	Right lateral	21	9	30
	Supine	13	1	14
	Variable/ mixed	5	0	5
TOTAL		74	12	86

According to below table 8, Lateral postures, particularly right lateral, showed the highest frequency of headache start, which most usually happened in the same position as the preferred position reported by participants.

Table 8: Cross tabulation between preferred sleep position and position Which frequently exacerbate headache symptoms.

		Which position help to relieve your pain?					Total
		Prone	Left Lateral	Right lateral	Supine	Variable/ mixed	
Preferred sleep position	Prone	8	2	6	1	3	20
	Left lateral	0	1	6	3	7	17
	Right lateral	2	4	11	7	6	30
	Supine	1	1	5	5	2	14
	Variable/ mixed	0	0	1	1	3	5
		11	8	29	17	21	86

Below table 9, shows the distribution of participants' sleeps characteristics (n = 86) including sleep disruptions, difficulties falling asleep, and sleep quality. It computes total and mean scores, displays the frequency and percentage of replies for each Likert category, and classifies the outcomes as either positive (favorable) or negative (unfavorable). The table shows that while most participants reported

moderate to high sleep quality, sleep disruptions and trouble falling asleep were common as indicated by negative mean scores in those items.

Table 9: Frequencies and Likert scale analysis of participant's sleep characteristics including sleep quality, difficulty in falling asleep, and sleep disturbances.

S no	KNOWLEDGE QUESTION (n=86)	LIKERT SCALE	FREQUENCY (%)	MULTIPLY BY LIKERT SCALE FREQUENCY	TOTAL SCORE	MEAN SCORE	INTERPRETATION
1.	How long (in minutes) does it usually take you to fall asleep?	0-15mins	41 (47.7%)	164	273	2.5	Positive
		16-30mins	21(24.4%)	63			
		31-60mins	22(25.6%)	44			
		More than60 mins	2(2.3%)	2			
2.	How would you rate your sleep	Very good	7(8.1%)	28	212	2.5	Negative
		Fairly good	33(38.4%)	99			

	quality overall?	Fairly bad	39(45.3%)	78			
		Very bad	7(8.1)	7			
3.	How often do you have trouble falling asleep because you cannot get to sleep within 30 minutes ?	Never	7(8.1%)	28			Negative
		Less than once a week	15(17.4%)	45	179	2.5	
		1-2 times a week	42(48.8%)	84			
		3 or more times a week	22(25.6%)	22			
4.	How often does neck pain or	Never	7(8.1%)	28	179	2.5	Negative
		Less than once a week	15(15.4%)	45			

	stiffness delay your ability to fall asleep?	1-2 times a week	42(48.8%)	84			
		3 or more times a week	22(25.6%)	22			

Using a Likert scale, the below table 10, displays the distribution of participants' nightly sleep duration (n = 86) among three categories: <6 hours, 6–8 hours, and >8 hours. The overall sleep duration pattern is interpreted as positive or favorable in the table that displays the total and mean scores.

Table 10: Distribution of participant's Nightly sleep duration using Likert scale

S.NO	KNOWLEDGE QUESTIONS (n=86)	LIKERT SCALE	FREQUENCY (%)	MULTIPLY BY LIKERT SCALE FREQUENCY	TOTAL SCORE	MEAN SCORE	INTERPRETATION
1.	How many hours of actual sleep do you usually get at night?	<6hours	30(34.9%)	90	193	2.2	Positive
		6-8hours	47(54.7%)	94			
		>8hours	9(10.5%)	9			

DISCUSSION

The current study investigated the link between sleep posture, sleep quality, and cervicogenic headache (CGH) in 86 participants with the mean± standard deviation of 1.87±0.865. The findings revealed a significant relationship between habitual sleep posture and CGH onset, with the right lateral sleep position having a dual effect. The regular holding of the right lateral side of the body was connected with an increase in the intensity of the CGH, while the production of the positional changes in sleep was stated to help the symptoms. These data signify that the influence of sleep posture on CGH is not a matter of fact, but it is dependent on the way and time of the posture abidance, thus, it highlights the significance of personalized sleep ergonomics for the treatment of CGH.

Cross, tabulation analysis showed that positions changes were the most common method among participants to alleviate CGH symptoms during sleep, in particular, the right lateral position was adjusted for the greatest effect. This exemplifies the real, world benefit of behavioral interventions targeting sleep posture as a means of relieving symptoms in CGH patients.

Most of the participants claimed to have slept for an adequate amount of time, however, the Likert scale results showed that the items related to difficulties in falling asleep and sleep disturbances had negative mean scores which indicate poor sleep quality. These results emphasize that merely ensuring adequate sleep duration is not enough to prevent the occurrence of CGH, and that sleep continuity and quality are crucial factors.

Pain referral in a cervicogenic headache is through the trigeminocervical nucleus as well as the upper cervical nerve roots (C1C3). Such a headache is a secondary one, which means that it originates from the structures of the cervical spine. Because of differences in diagnostic criteria, study populations, and the methods of assessment, researchers conducting population, based studies have found the prevalence of CGH to be very different, i. e., from 0. 7% to 13. 8%.

A sizeable population, based study in Norway using the Cervicogenic Headache International Study Group diagnostic criteria found a 4. 1% prevalence of CGH, thereby indicating that CGH is a condition of clinical significance even though it is less frequent than primary headaches.[17] These

prevalence figures emphasize the necessity of investigating sleep and other behaviors in people with CGH as these are aspects that can be changed.

Additionally, research conducted in the past has revealed that patients with CGH usually become psychologically prepared and, therefore, may unconsciously change their sleeping positions as a means of alleviating the pain. Even though the individuals may subjectively feel that their posture is helping, these compensatory mechanisms may conceal measurable relationships between posture and symptoms, which might be the reason why the current study has not found any statistically significant results.[14]

The results of this study show that sleep posture and pillow features are important factors in the frequency and intensity of cervicogenic headaches. In line with earlier studies, patients who used side-lying positions with sufficient cervical support reported less severe headaches, while those who slept in supine or prone positions and with inadequate pillow support reported more discomfort.

These findings largely align with the studies that had been done before. Ahmad et al. (2024) pointed out that the way a person sleeps regularly and the lack of proper pillow support are the major causes of the aggravation and the increase in the number of the occurrence of CGH, thus, the study highlights postural alignment as a very important factor in the management of CGH. In the same manner, Safdar et al. (2024) observed that the change of position during sleep helped in reducing the intensity of CGH, thus, supporting the present research that the deliberate alteration of sleep postures can lead to the relief of symptoms. Aslam et al. (2024)[1] pinpointed the significance of sleep disturbances and poor sleep quality in the frequency of occurrence of CGH, which is in agreement with the current finding that individuals who have difficulty initiating sleep and are frequently interrupted report the onset of CGH even when total sleep duration is sufficient.

This aligns with the observations of Ahmad et al. (2024) and Cary et al. (2021),[6] who reported that sleep posture and pillow ergonomics directly influence cervical strain and waking spinal symptoms. The research further establishes a very close relationship between the quality of sleep and the severity of headaches, thus providing evidence for the two, way interaction cited by Korabelnikova et al.

(2020).[5] Participants with disrupted or poorly quality sleep reported higher headache intensity, thus showing that sleep disturbance is both a cause and an effect of cervicogenic headache.[5]

Besides that, the information here goes on to support the arguments of Rani et al. (2023)[11] and Dunning et al. (2016) who were certain about the pain relief resulting from cervical mobilization and postural correction, and this is proven by the fact that even slight changes in sleep posture can alleviate symptoms. The current study concentrates on the factors that are easily changeable and are quite common, such as habitual sleep behavior and pillow choice, thus it offers a good deal of valuable information that is accessible to patients beyond the clinical environment, whereas previous works of literature mostly had a focus on clinical interventions and exercise programs that are structured. These findings are consistent with the studies of Sudibyo et al. (2025)[7] and Mingles et al. (2021), who state that poor sleep and bad posture detrimentally affect the daily functioning and quality of life of people experiencing cervicogenic headaches.

Essentially, the study functions as a guide to the characteristics of CGH by presenting the interplay of habitual sleep behaviors sleep disturbances, and postural ergonomics as the main factors for headache onset and severity. The double impact of the right lateral position strongly indicates the intervention necessity to be individualized, thus, efficient non pharmacological ways such as postural adjustments and better sleep quality to control CGH are the examples given. The findings here are of considerable clinical importance as they indicate that patients with CGH may benefit from receiving behavioral guidance on sleep posture and ergonomic sleep practices (supported by literature)[20] in addition to the regular headache treatment.

CONCLUSION

Cervicogenic headache (CGH) is indicated as a sleep posture and sleep quality, related condition by this study. The contradictory nature of this position is a factor that on the one hand, intentional changes of posture during sleep may relieve the symptoms, whereas usual right lateral sleep posture may lead to the production of headaches. Even cases of adequate sleep duration, sleep disruptions, and difficulty falling asleep were reported, thus stressing the importance of sleep quality in the

treatment of CGH. The results point to the desperate need of a concerted non, pharmacological intervention, which among other things, includes an ergonomic sleep position provision and sleep quality improvement techniques as very significant factors in the management and prevention of CGH.

LIMITATIONS

- This was a specific study which did not generalize its findings
- The study was limited to Helping Hand Institute of Rehabilitation Sciences Mansehra only
- Changes in sleep pattern and pain relief were reported by the participants themselves and, thus, may not be entirely accurate.
- Sleep quality was not determined through an objective measuring device such as a sleep monitor; it was assessed based on the participant's opinion
- Variations in participant sleeping positions and body types might have influenced the outcome.

RECOMMENDATION

FUTURE STUDIES

- Explore how the causes of headaches are related to sleep quality and sleep position by conducting studies over a longer period of time.
- To achieve a more accurate assessment, implement objective sleep measures such as an actigraphy or polysomnography.
- Use bigger and more diverse samples for the study and also consider factors like physical appearance, stress, presence of other diseases, and the level of pain.

CLINICAL IMPLICATION

- Use a patient, centered approach to encourage individuals in discovering pain, relieving postures for sleep.

- Whilst controlling headaches, also assess the quality of your sleep and give recommendations regarding pillows, mattresses, and ergonomics.

AUTHORS CONTRIBUTION

Conceptualization: Muhammad Naveed, Dr. Yasir Majeed

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All authors read and approved the final manuscript.

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