

Sleep Quality in Patients of Chronic Tension Type Head Ache: Report from a Tertiary Care Facility

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Abstract

Present study was undertaken with the objective of identifying sleep quality among patients with Chronic tension type headache (CTTH) and to identify various factors influencing sleep quality among patients with CTTH. Using consecutive sampling technique, a cross-sectional study was conducted on 169 patients who were diagnosed with CTTH in a tertiary care centre in North India to assess the sleep quality and its associated factors in patients of CTTH. Pittsburgh Sleep Quality Index (PSQI) was used to assess the sleep quality of the patients. Wong Backer Foundation Pain intensity scale was used to assess the severity of pain. The mean PSQI in patients with CTTH was 15.59 ± 1.19 . All 169 patients enrolled in the present study were found to have poor sleep quality as their total PSQI was more than or equal to five. All patients reported less than five hours of night sleep, more than 60 minutes of sleep latency (time taken to fall asleep), less than 75 percent sleep efficiency, sleep disturbances up to twice a week, day time dysfunction due to daytime sleepiness and low enthusiasm three or four times a week. The common causes of prolonged sleep latency reported were pain, bad dreams and nocturia. All patients reported that they use sleep medications (prescribed or over the counter), out of which five percent reported the use of sleep medication more than three times a week and rest (95%) reported the use of sleep medication less than once a week. There was a significant positive correlation between PSQI and headache duration ($r=0.39$, $p<0.001$), headache frequency ($r=0.31$, $p<0.001$) as well as headache severity ($r=0.4$, $p<0.001$). Significantly poor sleep quality was reported by patients who are males ($p=0.006$), married, divorced ($p=0.042$), had shorter duration of illness ($p<0.001$) and patients who are only on analgesics ($p<0.001$). Patients with CTTH are found to have poor sleep quality that can increase severity, duration and frequency of pain. Poor sleep quality and pain in turn adversely affect the activities of daily living, day function and quality of life of patients suffering from CTTH. Hence nurses must aid the patients with appropriate interventions, essentially non-pharmacological and lifestyle modifications in the management of CTTH.

Chronic tension type headache (CTTH) is associated with disability among children, adolescents and adults. Sleep disturbances and poor sleep quality are reported among patients of CTTH. Identification of various factors influencing sleep quality in patients with CTTH may aid in formulating appropriate interventions for improving the sleep quality.

The CTTH is chronic form of tension-type headache (TTH). Approximately 0.5 to 4.8 percent of the

worldwide population is affected with CTTH, defined as the occurrence of bilateral TTH at a frequency of ≥ 15 days per month with pressing or tightening quality, mild to moderate intensity, lasting hours to days or unremitting and not worsening with routine physical activity but may be associated with mild nausea, photophobia or phonophobia. Though it is believed that CTTH is due to the muscle tension in head, neck or face, the exact cause of CTTH is not known, and multifactorial. Along with substantial role of socio-demographic variables and physical factors (poor vision, chronic diseases and lack of sleep), psychological factors (stress and stress inducing factors) are also associated with CTTH.

CTTH is reported to be associated with lost working days, reduced work efficiency, impaired relationship with family, friends and colleagues. It may also make the individual to withdraw from family and so-

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cial activities. As seen in other nervous system disorders, CTTH may result in poor quality of life of patients and can increase the burden of family caregivers.

Relation between sleep disturbances and pain may be complex, but both are interrelated. Similar inter relationship between sleep and CTTH also is reported. Sleep disorders of different types are reported in patients with CTTH. Other than pain severity and frequency, socio demographic and clinical factors also may influence the sleep quality and may result disability in patients with CTTH. Improving sleep quality is important to improve the functional status and may prevent onset of CTTH. Assessment of sleep quality and identification of various associated factors will aid in proper pharmacological and non-pharmacological treatment including life style modification. Non-pharmacological management is essential to reduce medication-associated head ache and medication side effects. Hence present study was undertaken with the objective of identifying sleep quality among patients with CTTH and to identify various factors influencing sleep quality among patients with CTTH.

Review of the literature

Ong et al (2009) examined pain-related self-management strategies in young-adult patients with CTTH. The results revealed that a significantly greater proportion of the patients with CTTH reported sleep problems and stress as triggers of headache, and going to sleep as a coping strategy for pain. The headache group also reported significantly higher ratings of pain interference with sleep. Going to sleep was the most commonly used self-management strategy by headache sufferers and also rated as the most effective strategy. These findings suggest that a bidirectional relationship between sleep disturbance and headache is present in patients of CTTH.

Engstrom et al (2014) compared subjective and objective sleep quality in patients with TTH patients, and evaluated the relationship between sleep quality and pain thresholds in controls and TTH patients. Findings showed that patients with TTH had more anxiety, insomnia, long awakenings, daytime sleepiness, day time tiredness and reduced subjective sleep quality compared to healthy controls. Inadequate sleep contributed to increased pain sensitivity and headache frequency in TTH.

Materials and methods

Using consecutive sampling technique, a cross sectional study was conducted in a tertiary care centre in North India on 169 patients who were diagnosed

with CTTH to assess the sleep quality and its associated factors in patients of CTTH. The patients who were treated with analgesics or/and beta blocker or mild anti-depressants were enrolled. Informed written consent was taken from the patients, patient information sheet was given and confidentiality of obtained data was ensured. The demographic and clinical data was collected with the help of interview and records.

Pittsburgh Sleep Quality Index (PSQI) was used to assess the sleep quality of the patients. The tool is available in Hindi and contained 19 items. It differentiates “poor” from “good” sleep by measuring seven domains of sleep including subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication and daytime dysfunction over the last month. Scoring of the answers is based on a zero to three scale, where 3 reflects the negative extreme on the Likert Scale. Hence the score ranges from 0 to 21 and a higher score indicates worse sleep quality. A global

Table 1: Socio-demographic and clinical profile of patients with CTTH (n=169)

Demographic and clinical variables of patients		Mean $\pm$ SD or f (%)
Age		45.18 $\pm$ 10.93
Gender	Females	96 (57)
	Males	73 (43)
Marital status	Unmarried	15 (9)
	Married	143 (85)
	Divorced	5 (3)
	Widowed	6 (4)
Type of family	Nuclear	99 (59)
	Joint	70 (41)
Education	Illiterate/ Primary	1 (0.6)
	Secondary	21 (12.4)
	Higher-secondary	55 (32.5)
	Graduation & above	69 (40.8)
Occupation	Student/unemployed	75 (44.4)
	Unskilled labourer	17 (10)
	Salaried/Self employed	64 (38)
	Retired/Pensioner	13 (7.7)
Monthly income (Rs./month)	10000-15000	30 (17.8)
	>15000	139 (82.2)
Habitat	Rural	18 (10.7)
	Semi-urban	22 (13)
	Urban	129 (76.5)
Illness duration	6 months - 1 year	7 (4.1)
	> 1yr-2yrs	70 (41.4)
	> 2yrs-3yrs	60 (35.5)
	> 3yrs	32 (18.9)
Medications	Analgesics	60 (35.5)
	Analgesics and beta-blockers/mild anti-depressants	109 (64.5)

Table 2: Sleep quality and pain dimensions of patients with CTTH (n=169)

Pain and sleep quality score (Maximum possible score)	Mean±SD
Headache duration per day	8.6805±1.68
Headache frequency per week	19.43±1.38
Head ache severity (10)	6.62±1.16
PSQI (21)	16.25±1.48

sum of “5” or greater indicates a “poor” sleeper. The time taken to administer the tool was five minutes. It has a high internal consistency with Cronbach alpha of 0.83. Wong Backer Foundation Pain intensity scale was used to assess the severity of pain. The pain scale described as face 0 (doesn’t hurt at all), face 2 (hurts just a little bit), face 4 (hurts a little bit more), face 6 (hurts even more), face 8 (hurts a whole lot) and face 10 (hurts as much as you can imagine). Pain frequency of previous one week of the day of assessment was counted and pain duration was calculated by taking the average of pain duration of each day during the previous one week of assessment.

Results

Chi square test was used to assess the association between categorical variables, Pearson correlation coefficient was used to find correlation between two continuous variables and independent ‘t’ test was used to assess the influence of binary variables on pain severity and one way Anova was used to assess the influence of multi categorical variables.

Sociodemographic and clinical profile of patients showed the mean age of the patients as 45.18±10.93 with a range of 18 years to 72 years (Table 1). Out of 169 CTTH patients studied, 96 (57%) were females, 75 (44.4%) were salaried or self-employed and 82.2 percent had monthly family income more than Rs. 15,000/-. Approximately half of the patients i.e. 69 (40.8%) were graduate and above graduates and 55 (32.5%) were having education up to higher secondary. Most of the patients were married (85%) and urban inhabitants (76.5%). Duration of CTTH since diagnosis was between one year to two years in 41.4 percent of the patients. Most of the patients (64.5%) were treated with both analgesics and beta blockers/mild anti-depressants and rest of them (35.5%) were only on analgesics.

Pain and sleep characteristics of patients is shown in Table 2. The mean pain score reported by the patients was 6.62±1.16, frequency 19.43±1.38 per week, and duration 6.62±1.16 per day. Out of a possible score of 21, the mean PSQI was 15.59±1.19. All 169 patients

enrolled in the present study were found to have poor sleep quality as their total PSQI was ≥ 5 . When assessed subjective perception of sleep quality, 57 percent reported as fairly bad and 43 percent reported the same as very bad. None of the patient reported good sleep quality (Fig 1). All patients reported less than five hours of night sleep, more than 60 minutes of sleep latency (time taken to fall asleep), less than 75 percent sleep efficiency, sleep disturbances up to twice a week, day time dysfunction due to day-time sleepiness and low enthusiasm three or four times a week. The common causes of prolonged sleep latency reported were pain, bad dreams and nocturia.

All patients reported that they use sleep medications (prescribed or over the counter), out of which five percent reported the use of sleep medication more than three times a week and rest (95%) reported the use of sleep medication less than once a week (Fig 2). There was no significant difference in PSQI among those having used sleep medication less than once a week and those who use more than three times a week. But subjective sleep quality was reported as very bad by all subjects using medication more than thrice a week as compared to 62 percent patients who took medication less than once a week ($\chi^2=11.88, p=0.001$).

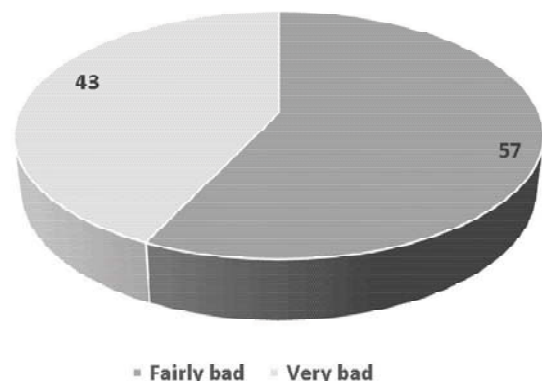


Fig 1: Subjective sleep quality

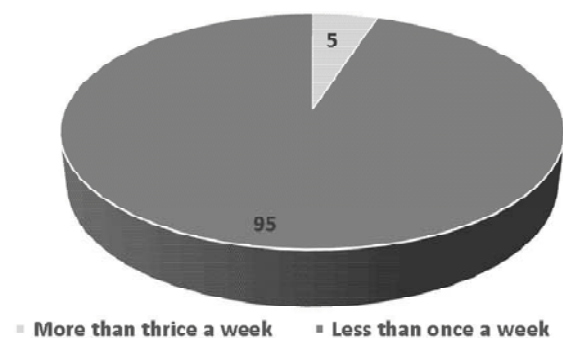


Fig 2: Frequency of usage of sleep medication

Table 3: Association of various factors with headache duration (n=169)

Patients' variables		PSQI score mean	Test value	p value
Age (years)			0.56	0.47
Gender	Males	16.61±1.51	-2.77	0.006*
	Females	15.59±1.41		
Marital status	Unmarried	15.6±1.24	2.8	0.042*
	Married	16.37±1.49		
	Divorced	16.2±1.64		
	Widowed	15±0.12		
Type of family	Nuclear	16.07±1.44	-1.87	0.063
	Joint	16.5±1.51		
Occupation	Student/unemployed	16.49±1.5	1.66	0.177
	Unskilled labourer	16.41±1.54		
	Salaried/Self employed	15.98±1.41		
	Retired/Pensioner	15.92±1.44		
Income	10000-15000	16.4±1.52	0.62	0.54
	> 15000	16.21±1.47		
Duration since illness onset	< 2years	17.57±1.57		
	> 2years	15.12±0.56		
Systemic illness	No	16.21±1.47	0.41	0.69
	Yes	16.29±1.49		
Medications	Analgesics	17.8±0.76	16.14	<0.001*
	Analgesics and beta-blockers/mild anti-depressants	15.39±1.01		

*Significant at p value 0.05

Factors influencing sleep quality

Various socio demographic and clinical variables which could influence sleep quality of patients with CTTH were analysed and is shown in Tables 3 and 4.

The mean PSQI of 16.61±1.51 in males was significantly higher as compared to 15.59±1.41 in females ($p=0.006$). Significantly higher PSQI of 16.37±1.49 and 16.2±1.64 was reported by patients who were married and divorced as compared to 15.6±1.24 and 15±0.12 in those who are unmarried and widowed respectively ($p=0.042$). Significantly higher PSQI of 17.57±1.57 was reported by patients with duration of illness less than two years as compared to only 15.12±0.56 in patient with illness duration more than two years ($p<0.001$). A significantly higher PSQI of 17.8±0.76 was reported by patients on

analgesics, as compared to only 15.39±1.01 in patients who were on both analgesics and beta blockers/ mild anti-depressants ($p<0.001$). Hence, significantly poor sleep quality was reported by patients who are males, married, divorced, had shorter duration of illness and patients who are only on analgesics. Sleep quality based on PSQI did not show any association with other demographic and clinical variables such as age, marital status, type of family, educational status, occupation, income, habitat and presence of any systemic illness.

The correlation between sleep quality and pain is shown in Table 4. There was a significant positive correlation between PSQI and headache duration ($r=0.39$, $p<0.001$), headache frequency ($r=0.31$, $p<0.001$) as well as headache severity ($r=0.4$, $p<0.001$). This shows that increased headache frequency, duration and severity results in poor sleep quality and vice versa.

Discussion

Present study aimed to identify the sleep quality and associated factors among patients with CTTH. Similar to previous reports (Kulkarni et al, 2015; Gururaj et al, 2014), mean age of the patients in present study was 45.18±10.93, majority of them were females, married and employed. Though exact causes and mechanism of CTTH is unclear, factors such as stress and sleep disturbances are considered to be the primary triggering factor in these patients.

The bidirectional relationship between headaches and sleep disturbances is complex and difficult to analyse. Headache is associated with wide range of sleep disorders and both symptoms may have causal relations. Common sleep disorders reported in patients with CTTH include sleep apnoea, general sleep disturbance such as insomnia, insufficient sleep, more long awakenings, excessive day time sleep, circadian rhythm sleep disorder, parasomnia, hyper-somnolence, restless legs disorder and sleep related breathing disorder.

Insomnia and sleep apnoea have been identified as risk factors for TTH, although the pathogenesis of sleep disturbance in this population is unclear. Similar to previous studies, the present study also shows that patients with CTTH suffer from poor sleep quality based on disturbed night sleep, increased sleep latency which is the time taken to fall asleep, decreased sleep efficiency and increased day time sleep. All patients reported that their daily night sleep is of

Table 4: Correlation between head ache and sleep quality (n=169)

Pain-related variables	PSQI	
	r' value	p value
Headache duration	0.39	<0.001*
Headache frequency	0.31	<0.001*
Headache severity	0.4	<0.001*

less than five hours. Poor sleep quality based on PSQI was reported by all the patients which is better quantified as compared to subjective report where too all patients reported fairly bad or very bad sleep quality. Poor sleep quality in patients of CTTH is also evident by slow wave sleep, less fast arousal in polysomnography. Pain was reported as the most common cause of prolonged sleep latency, followed by other causes such as bad dreams and nocturia. As reported by the patients in present study and based on other findings pain is reported as a cause for sleep disturbance. Similarly, poor sleep quality is a triggering factor for increased pain sensitivity and frequency. Present study also shows that poor sleep quality results in increased headache frequency, duration and severity and vice versa. It is known that sleep has a restorative function in the brain and lack of sleep may hamper this protective mechanism.

There is a bidirectional relation between both headache and sleep, the mechanism of this relation is complex and not fully clear. Involvement of hypothalamus may affect both sleep and pain. Recent biochemical and functional imaging studies in patients with primary headache disorders has led to the identification of potential central generators which are also important for the regulation of normal sleep architecture. The hypothalamus is known to modulate a multitude of functions and has been shown to be involved in the pathophysiology of a variety of primary headaches including cluster headache and chronic migraine. Further, it is also known that melatonin, a hormone secreted by penial gland and regulated by hypothalamus is responsible for maintaining circadian rhythm of sleep. Studies show that supplemental melatonin improves sleep and reduces pain. Melatonin may be helpful in patients with headache who are suffering from delayed sleep phase syndrome. Its effectiveness may be due to modification of vascular and nociceptive systems or to its chronobiological action which adjusts the patient's biological clock to his/her life-style⁴¹. Inter-related sleep and pain pathway may be another reason for bidirectional relation between pain and sleep.

Sleep is frequently used as a self-management strategy for pain. When sleep problems are trigger of headaches, going to sleep is reported as a coping strategy for pain. Hence it may be consistent with the hypothesis that excessive sleep-seeking behaviour might be a mediating factor in the development of insomnia, night time disturbances and poor day dysfunction among people with CTTH.

Daytime dysfunction and fatigue are common in patients with CTTH. Patients in present study also reported low enthusiasm during the day and day time

disturbances which could be due to lack of sufficient night sleep or attributed to increased frequency and severity of headache resulted from poor quality of sleep. CTTH affects the activities of daily living of the individual, increase stress, reduce quality of sleep and increase overuse of pain and sleep medications and can precipitate medication overuse headache (MOH). It is another phenomenon that leads to intensified analgesic use and its side effects. Significantly poor sleep quality was reported by patients who are males, who had shorter duration of illness and patients who are only on analgesics. Females are reported to have high prevalence of CTTH as well as poor sleep quality. But poor sleep quality in present study was reported by males though CTTH was prevalent in females. Poor sleep quality was reported in married and divorced patients. Comparatively poor quality of sleep in patients with shorter duration of illness and in patients who are only on analgesics could support the influence of pain on poor sleep quality as severity and frequency of headache is found to be more during the initial period and in patients who are only on analgesics. Patients on beta-blockers or mild anti-depressant in addition to analgesics are found to have had better pain control.

Sleep medications such as benzodiazepines, non-benzodiazepines may reduce sleep latency and sleep disturbances. But its effects on improving day time function need to be explored. In present study, all patients reported that they use sleep medications (prescribed or over the counter), but there was no significant difference in PSQI among those having taken sleep medication less than once a week and those who use more than three times a week. In present study, subjective sleep quality was reported as very bad by all subjects using medication more than thrice a week as compared to 62 percent patients who took medication less than once a week. However present study had excluded patients on amitriptyline. Irrespective of the frequency of sleep medications, all patients reported more than 60 minutes of sleep latency (time taken to fall asleep), less than 75 percent sleep efficiency, sleep disturbances up to twice a week, day time dysfunction due to daytime sleepiness and low enthusiasm three or four times a week. Hence the appropriate use of sleep medication in patients with CTTH need to be explored.

Interventions to improve sleep quality is necessary to reduce pain in patients with CTTH, through interventions. As there are many side effects of long run pharmacological treatment, the focus must shift to non-pharmacological interventions and life style modifications, which is a less explored area in patients

with CTTH. Many non-pharmacological interventions are found to be effective in both, may be due to the mechanism of action on interlinked anatomy or physiology. Nurses have a vital role in encouraging various non-pharmacological measures to improve sleep quality, hence to reduce the frequency and severity of headache. Improving sleep quality should be considered as a part of headache management.

Conclusion

Patients with CTTH are found to have poor sleep quality, that can exacerbate severity, duration and frequency of pain. Poor sleep quality and pain in turn adversely affect the activities of daily living, day function and quality of life of patients suffering from CTTH. Hence nurses must aid the patients with appropriate interventions, essentially non-pharmacological, and lifestyle modifications in the management of CTTH.

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कुदरत का नायाब तौहफा है सर्दी की धूप

कुदरत भी बहुत गजब की चीज है। दिसंबर, जनवरी के महीनों में जब सर्द हवाओं की चलते ठिठुरन में रजाई छोड़ना मुश्किल हो जाता है वहीं बचाव के लिए खिलखिलाती धूप भी मिल जाती है। अफसोस यह है कि कुछ लोग बंद कमरों में घुसे रहते हैं और कुदरत की इस नायाब ऑफर के तमाम फायदों से वंचित रहते हैं। खुले में वक्त नहीं गुजारने की आदत के कारण भारत सहित दुनियाभर में लोगों में विटामिन डी की कमी के मामले दर्ज किए जा रहे हैं। याद रहे सूर्य की रोशनी विटामिन डी का उम्दा, मुफ्त में मिलने वाला सर्वत्र, सर्वसुलभ स्रोत है।

सर्दियों में, खासकर सुबह के वक्त, रोजाना आधा घंटे आप धूप सेक लें तो आपके शरीर में विटामिन डी की कमी नहीं रहेगी। दर असल धूप में रहने से त्वचा स्वयं ही विटामिन डी निर्मित कर लेती है। संस्तुति यह है कि इस दौरान शरीर के करीब आधे हिस्से में सूर्य की रोशनी पड़ती रहे। याद रहे, विटामिन डी गठिया, स्केलेरोसिस तथा दिल के रोगों की संभावना भी घटाता है। हालिया शोधों से यह भी पता चला है कि विटामिन डी की कमी विस्मृति (यानी डिमेंशिया) के प्रमुख कारणों में है।