Research Article

Frequency of Cariogenic Headache Due to Sleep Deprivation in Medical Professionals

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Abstract

Objective: To determine the frequency of cervicogenic headache due to sleep deprivation in medical professionals. **Study design:** A cross sectional observational study Place and duration: Fatima Memorial Hospital, Lahore was used as setting for this study. Duration of the study was 6 months from 1st May 2021 to 1st November 2021. **Methodology:** The cross sectional study includes 60 Post graduates that were recruited using non probability convenience sampling. Informed consent was taken from the participant before illing of the questionnaire. Cervical lexion rotation test was performed on all the participants, afterwards they were given a modi ied version of structured 'Headache questionnaire' of Stony Brook medicine, which consists of questions regarding the headache, pre and on call sleep habits. Descriptive statistical analyses were done on sample of 60 by using SPSS 22.0 version. *Chi square* was used to ind association between sleep deprivation and headache. **Results:** Cross tabulation between post call severity of headache and sleep schedule during long call shows that in there were signi icant association with p value=0.046 (<0.05) between headache and sleep deprivation, as the sleeping hours were reduce, severity of headache were more marked. **Conclusion:** The study concluded that there was an association between sleep deprivation and severity of headache. In the light of these results it could be suggested that long calls hours should be reduced so that the productivity be increased, quality of life of medical professional could be improved and prevalence of cervicogenic headache could be reduced.

Keywords: Cervicogenic headache; Neck pain; Headache; Sleep deprivation

Introduction

A Cervico Genic Headache (CGH) is a torment that creates in the neck; however an individual feels the pain in their head. It is a type of secondary headache as classified by international headache society in 1988 [1]. Cervicogenic headaches are sometimes misused with migraine and tension type headaches. People suffering from cervicogenic headaches have reduced cervical movements particularly at upper cervical spine, which get worsens if triggered by applying pressure on certain points. Clinical manifestation of cervicogenic headache includes pain on one side only that may radiate to the front of head or behind the eye [2]. Psychological issues for example headache management locus of control and self-efficacy, and negative affect/emotional states can change the probability of a headache attack being produced, the apparent intensity of headache pain [3-4]. Around 47% of the universal inhabitants undergo different from a headache, and 15-20 percent of those headaches are cervicogenic. Females look as if more prone to CGHs affecting 4 times as many women as men [5].

Subsequently CGHs usually affect women, it is essential to ponder menstruation and hormonal shifts as a contributor to headaches [6-7]. The most significant clinical finding to identify CGH is impairment of C_1-C_2 (atlanto-axial) motion. More risk factors include fatigue, sleep difficulties, prior neck injuries, poor posture, and muscular stress. Diagnostic test to distinguish cervicogenic headache from migraine and tension type headache is cervical flexion rotation test, the sensitivity and specificity of the flexion-rotation test is 91% and 90%, respectively (P<.001), with an overall diagnostic accuracy of 91% (P<0.001) [8]. Headache is a chronic disease with variable frequency and disability and has

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a great impact on health related quality of life and thus affects the both personal and professional aspects of life of any individual [9]. The aim of this study was to find how frequently cardiogenic headache is prevalent due to sleep deprivation in post graduate residents, so that awareness regarding provoking factors could be increased, that will eventually reduce the frequency of this condition.

Materials and Methods

Methodology

In this cross sectional observational study convenient sampling technique was used for collection of data from Fatima Memorial Hospital, Lahore from 1 November 2017 to 1 May 2018. Keeping confidence level 95%, anticipated population proportion 0.04 [10]. Absolute precision 0.05, calculated sample size was 60. After taking permission from the respective department, the eligible Post graduates resident of medicine, surgery, gynecology, pediatrics, gastroentology and nephrology, both males and females around the age of 25-32 and sleep duration of less than 7 hours, were assessed and recruited for the study. The post graduates residents older than 32 years of age, having a history of headaches due to migraine, sinusitis, infection or due to any serious brain pathology, post graduates of dermatology, ophthalmology, rheumatology and radiologist and residents having any history of tumor, surgery, trauma around neck area particularly whiplash were excluded from the study. Informed consent was taken from the participants. Cervical Flexion-Rotation Test (CFRT) were applied to assess dysfunction at the C_1-C_2 motion segment and Modified version of structured 'Headache questionnaire' of Stony Brook medicine were used to enquire about history of headache and a detailed description of headache symptoms, typical frequency (days/week), intensity and duration of headache episodes were obtained. Questions regarding the pre and on call sleep habits were included in questionnaire. All participants go through the same procedure. VAS scale was used to enquire about pre and post call intensity of pain. The aim and process of the study was completely explained to every participant. Ethical approval was taken from Institutional Review Board (IRB) of Fatima Memorial Hospital, Lahore, before data collection procedure.

Data analysis

The data was entered and analyzed using Statistical Package for Social Sciences (SPSS 22.0). Descriptive statistics including frequencies and percentages were extracted for demographics. *Chi square* was used to find association between sleep deprivation and headache (Table 1).

Results

Table 1: Distribution according to age and gender (n=60).

Variable	N	Minimum	Maximum	Mean	Std Deviation
Age	60	25	32	27.52	2.095
Variable		**Frequency**		**Percent**	
Gender	Males	24		40	
	Females	36		60	
	Total	60		100	

Results regarding the distribution of cases according the age has showed mean age was 27.52 ± 2.09 years and out of 60 (100%), 48 (80%) were in age from 25 to 28 years and regarding the distribution of cases according the gender has showed out of 60 (100%), 36 (60%) were females and 24 (40%) were males (Table 2).

Table 2: Distribution of cases according to frequency and post call severity of headache (n=60).

		Frequency %	Percentage %
Frequency of headache	1 x /month	22	36.7
	1 x /week	27	45.0
	2-4 x /week	8	13.3
	Daily	3	5.0
	Total	60	100.0
Post call severity of headache (VAS)	Mild (1 to 3)	17	28.3
	Moderate (4 to 6)	19	31.7
	Severe (7 to 10)	24	40.0

	Total	60	100.0

Out of 60 (100%), 27 (45%) had frequency of headache once in a week and 22 (36%) had frequency of at least once in month results regarding post call severity of headache has showed that, out of 60 (100%), 24 (40%) had severe (7 to 10) pain and 19 (31.7%) had moderate (4 to 6) pain (Table 3).

Table 3: Distribution of cases according to cervical range of motion (n=60)

	Descriptive statistics				
Cervical range of motion	**N**	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
cervical flexion	60	38	50	42.4167	2.00247
cervical extension	60	38	57	43.2667	3.82173
cervical right side bend	60	30	55	42.2	2.12172
cervical left side bend	60	32	56	42.4	2.73211
cervical right rotation	60	46	60	56.1333	1.87279
cervical left side rotation	60	48	62	56.35	2.20035

Results regarding the cervicle range of motion has showed that mean cervical flexion was 42.41 ± 2.00, cervical extension was 43.26 ± 3.82 , cervical right side flexion was 42.20 ± 2.1,cervical left side flexion was 42.40 ± 2.7,cervical right side rotation was 56.13 ± 1.8 and cervical left side rotation was 56.35 ± 2.2 (Table 4).

Table 4: Distribution of cases according to cervical flexion rotation test.

Cervical flexion rotation test		**Frequency**	**Percent**
Valid	Range 41-45 (normal)	8	13.3
	Range 31 to 40	15	25
	Range 25 to 30	25	41.66
	Less than 25	12	20
	Total	60	100

Results regarding the cervical flexion rotation test has showed that out of n=60 (100%), 8 (13%) had normal range, 15 (25%) had slight reduction in cervical range (31 to 40 degree), 37 (61%) had moderate to severe reduction in cervical range (less than 30 degree) during the test, showing that 25 % of the participants had mild while 61% had severe C_1-C_2 dysfunction and prone to have a cariogenic headache (Table 5).

Table 5: Cross Tabulation and p-value between post call sleep schedule and severity of headache (n=60).

Association		**Sleep schedule on call**	**Total**	**P-Value**		
		An hour or less	2 to 4 hours	4 to 6 hours		
Post call severity of headache	Mild (1 to 3)	4	6	7	17	P value =0.046
	Moderate (4 to 6)	7	6	6	19	
	Severe (7 to 10)	16	6	2	24	
Total		27	18	15	60	

Results: Cross tabulation between post call severity of headache and sleep schedule during long call shows that in there was significant association with p value=0.046 (<0.05) between headache and sleep deprivation, as the sleeping hours were reduce, severity of headache were more marked. Out of 27 participants who usually had less an hour or less sleep during long calls, 16 (59.25%) had severe and 7 (25.92%) report to have moderate intensity of headache in comparison to those who were sleeping for 4 to 6 hours only

2 (13.33%) report to have severely intense headache after long calls.

Discussion

According to an estimate, headaches affect 47% of the population world widely. Many studies have been done in the past, in order to find out the prevalence of the headache in different populations, medical professionals are also one of them. According to the results of these studies, headaches are more common in women when compared to men. Results of the present study also showed more female predominance than male *i.e.* 36 (60%) were females and 24 (40%) were males which also correlate with previous studies [11]. A prevalence study on different types of headache among medical students in Pakistan was done in 2015 showed that cariogenic headache was the most prevalent type of headache [12]. Cervical movement impairments particularly at the C_1 and C_2 level is one of the important finding of cariogenic headache [13], and cervical flexion rotation test is one of the valid tool to make the diagnosis of cariogenic headache. A study done in 2007 to find the validity of cervical rotation test has showed that the sensitivity and specificity of the flexion-rotation test was 91% and 90%, respectively (P<. 001), with an overall diagnostic accuracy of 91% (P<0.001). The cervical flexion rotation test significantly assists in the differential diagnosis of cariogenic headache and in the identification of movement impairment at the $C_{1/2}$ segment in patients with cardiogenic headache; normal range of rotation motion in end range flexion has been shown to be 44°C to each side. In contrast, subjects suffering from headache with C_1-C_2 dysfunction have an average of 17°C less rotation [8]. The key findings of present study was that there was mean reduction in all cervical range of motions and cervical flexion rotation test was positive in more than 80% of the subject, with 25% of the participants had mild while 61% had severe C_1-C_2 dysfunction and were more prone to have a cardiogenic headache and intensity of headache was increased after long calls. Review of literature has showed that, the clinical presentation of cervicogenic headache usually exacerbated by neck movements and posture, and there is weakness in deep neck flexors. According to the present research, there were 27 (45%) were those who's headache gets worsen with exertion and according to recent records, the pain gets worsen it there is increased activity of neck flexors or atrophy in deep extensors and affected by posture. There were mean reduction in all cervical range of motion which correlates with previous researches that conclude that there is reduction in cervical ranges in subjects of cervicogenic headache [14]. Headaches due to insufficient or interrupted sleep are generally labelled "tension headaches" [15], but lack of sleep could also result in increased muscle tension in cervical and lower back area which may cause upper cervical dysfunction and thus result in cariogenic headache. As in present study 61% of the participants had severe C_1-C_2 dysfunction and there was significant association with p value=0.046 (<0.05) found between headache and sleep deprivation, as the sleeping hours were reduce, severity of headache were more marked.

Out of 27 participants who usually had less an hour or less sleep during long calls, 16 (59.25%) had severe and 7 (25.92%) report to have moderate intensity of headache in comparison to those who were sleeping for 4 to 6 hours only 2 (13.33%) report to have severely intense headache after long calls.

Conclusion

The study concluded that there was an association between sleep deprivation and severity of headache. In the light of these results certain strategies could be suggested for the hospital settings or the individuals who are involve in prolong working hour without sleep, that long calls hours should be reduced so that the productivity be increased, quality of life of medical professional could be improved and prevalence of cardiogenic headache could be reduced.

Limitation and Recommendations

- This study has some limitations. First, sleep parameters such as total sleep time and sleep quality were not evaluated by objective methods. Secondly more accurate diagnostic tools should be used to differential diagnose other types of headache.
- Although the present study should be of large population-based study but it has a limited sample size.
- This study further have limitations including the bias of the selection, results of the participants who were completing the inclusion criteria of long duty hours but did not participated may not be the same as of those who completed the questionnaire, so prospective studies may be needed in future to observe the associations.
- The study forms a basis for a subsequent qualitative study design aiming at a further understanding of factors associated with cervicogenic headache.

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