Journal of Society Medicine
Research & Review Articles on Diseases
Journal of Society Medicine. 2023; 2(6)

The Relationship between Fatigue and The Incidence of Tension-Type Headache in The First Semester Resident Doctors of The Faculty of Medicine Universitas Sumatera Utara

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ARTICLE INFO

Article history:
Received
19 May 2023

Revised
01 June 2023

Accepted
30 June 2023

Manuscript ID:
JSOCMED-190523-26-5

Checked for Plagiarism: Yes

Language Editor:
Rebecca

Editor-Chief:
Prof. Aznan Lelo, PhD

ABSTRACT

Introduction: Tension-type headache (TTH) is one of the major public health concerns globally with an incidence of 1.89 billion people. Fatigue is potentially debilitating and affects an individual's quality of life and is known to be associated with the case of TTH. The purpose of this study was To find out the relationship between fatigue and the incidence of tension-type headache in the first semester resident doctors of the Faculty of Medicine Universitas Sumatera Utara.

Method: The research design was an observational study with a cross-sectional approach which was undertaken at Haji Adam Malik Hospital and Network Hospital in January to February 2022 with all first semester resident doctors as research subject at Faculty of Medicine, Universitas Sumatera Utara in the period of August 2022. Fatigue was measured through the Fatigue Severity Scale (FSS), TTH frequency was measured using the third of the International Classification of Headache Disorders (ICHD-3) criteria, and TTH pain intensity was measured using numerical rating scale (NRS). Meanwhile, to analyze the relationship between fatigue and the incidence of tension-type headache, the Spearman correlation test was used.

Results: **:** Total subjects who met the inclusion and exclusion criteria was 98. Regarding to the results of statistical tests, a significant relationship was obtained between fatigue and TTH frequency (r= 0,294, p= 0,003), but there was no relationship between fatigue and the pain intensity (r= 0,143, p= 0,160).

Conclusion: There was a significant relationship between fatigue and TTH frequency. However, the relationship was not significant between Fatigue and the pain intensity.

Keywords

Fatigue, Tension-type headache, Resident

How to cite: Rozi F, Surbakti KP, Nasution IK. The Relationship between Fatigue and The Incidence of Tension-Type Headache in The First Semester Resident Doctors of The Faculty of Medicine Universitas Sumatera Utara. *Journal of Society Medicine*. 2023; 2(6): 207-213. **DOI: https://doi.org/10.47353/jsocmed.v2i6.54**

INTRODUCTION

The Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) asserts that headaches are one of the major public health concerns globally.[1] Headache is the most prevalent neurological symptom which can be of a serious condition, as in brain tumor, however it is generally a benign condition that includes primary headache such as migraine or tension - type headache (TTH).[2]

Globally, the prevalence of tension-type headache (TTH) is greater than that of the other headaches.2 In accordance with the 2016 Global Burden of Disease (GBD), approximately three billion people suffer from TTH and migraine worldwide, of which 1,89 billion suffer from TTH.[3] In a study on the prevalence of TTH in various countries, the highest TTH is in Indonesia.[3] The incidence of tension-type headache (TTH) in Indonesia is around 23.000 to 27.000 per 100.000 population, while on Sumatra Island, there are 25.000 to 27.000 people experiencing tension-type headache per 100.000 population.[4]

Fatigue is a common symptom that is potentially debilitating and impacts the health-related quality of life of individuals diagnosed with acute and chronic medical conditions.[5] The global prevalence of fatigue varies between 2,36-75,7%. The wide prevalence range value is due to the absence of gold standard test for fatigue, so there are differences in definitions, measuring instruments, and measurement methods. In a study conducted on anaesthesia resident doctors working at RSCM in 2018, it was reported that 55,6% experienced fatigue.[6] Residency training has a difficult and stressful developmental phase in professional careers. Residents often experience prolonged working hours, prolonged sleep deprivation, uncontrollable schedules, high job demands, and inadequate private-time. These can lead to burnout, which is characterized by emotional exhaustion, depersonalization, and decreased personal achievement. Besides, the residency can affect quality of life and cause sleep disorders, family issues, and even psychiatric disorders.[7]

METHOD

The design conducted in this study was an observational study with a cross-sectional approach. This research was conducted at H. Adam Malik Hospital, Network Hospital and Faculty of Medicine, University of North Sumatra from January to February 2023 with the all the first semester resident doctors as research subject. In the period of August 2022 used total sampling method of 105 people with 98 people who met the inclusion and exclusion criteria.

Resident doctors were interviewed regarding demographic data and health conditions. The third criterion of International Classification of Headache Disorders (ICHD-3) was used to measure the frequency of tension type headache and numerical rating scale (NRS) was used to measure the intensity of tension type headache pain. An NRS value of 0 was interpreted as no pain, scale 1-3 as mild pain, scale 4-6 as moderate pain and scale 7-10 as severe pain. Fatigue Severity Scale (FSS) is a method for evaluating the impact of a person's fatigue. Based on the results of validity and reliability processing, the Fatigue Severity Scale (FSS) consists of 9 questions on the questionnaire whice are declared valid and with high reliability (r = 0,880).

This study was analyzed univariately and bivariately using the SPSS Statistics for Windows version 21 computer program. Univariate analysis is an analysis used with the aim of knowing and identifying the characteristics of research subjects, where in this study, categorical data used the form of percentages (%) while numerical data used mean or standard deviation (SD). Bivariate analysis is an analysis used with the aim of determining how fatigue relates to the frequency and intensity of pain in the incidence of tension type headache. If the data is distributed normally, the Pearson Correlation test is used, while if the data is not distributed normally, the Spearman test is used.

RESULT

Resident doctors who experienced TTH were 67 people (68.4%) and who did not experience TTH were 31 people (31.6%), of which 40 (59.7%) who experienced TTH were men and 27 (40.3%) %) were women, while 14 (45.2%) did not experience TTH were men and 17 (54.8%) were women. Resident doctors aged <30 years who experienced TTH were 39 people (58.2%), while those who did not experienced TTH were 21 people (67.7%). However, 28 (41.8%) resident doctors aged ≥30 years experienced TTH, while 10 (32.3%) did not experience TTH (Table 1).

The subjects in this study consisted of various ethnic groups and the most common tribe found in this study was the Batak ethnic group with 35 people (52.2%) experiencing TTH and 18 people (58.1%) not experiencing TTH. The subjects in this study were mostly married, 41 people (61.2%) had TTH and 20 people (64.5%) did not experience TTH, and among the research subjects who experienced TTH most of them had children (56.7%). while those who did not experience TTH. Most of the subjects did not have children (51.6%).

The subjects in this study consisted of various tribes and the most common tribe found in this study was the Batak tribe with 35 people (52,2%) experiencing TTH and 18 people (58,1%) not experiencing TTH. The subjects in this study were mostly married with 41 people (61,2%) experiencing TTH and 20 people (64,5%)

not experiencing TTH, and among the study subjects who experienced TTH mostly had children (56,7%), while those who did not experience TTH mostly did not have children (51,6%).

Table 1. Demographic characteristics of the study objects.

Characteristics	TTH (n= 67)	No TTH (n= 31)	P
Gender, %			
Male	40 (59,7%)	14 (45,2%)	0,178[a]
Female	27 (40,3%)	17 (54,8%)	
Age, %			
< 30 years	39 (58,2%)	21 (67,7%)	0,368[a]
≥ 30 years	28 (41,8%)	10 (32,3 %)	
Tribe, %			
Batak	35 (52,2%)	18 (58,1%)	0,581[b]
Malay	8 (11,9%)	2 (6,5%)	
Chinese	4 (6,0%)	1 (3,2%)	
Aceh	7 (10,4%)	2 (6,5%)	
Javanese	8 (11,9%)	2 (6,5%)	
Minangese	4 (6,0%)	5 (16,1%)	
Sundanese	1 (1,5%)	1 (3,2%)	
Marital Status, %			
Married	41 (61,2%)	20 (64,5%)	0,752[a]
Not married	26 (38,8%)	11 (35,5%)	
Child Ownership Status, %			
Available	38 (56,7%)	15 (48,4%)	0,442[a]
None	29 (43,3%)	16 (51,6%)	
Study Program, %			
Surgery Program	21 (31,3%)	9 (29,0%)	0,817[a]
Non-Surgical Program	46 (68,7%)	22 (71,0%)	
Number of Shift Night , %			
<10 times per month	43 (64,2%)	20 (64,5%)	0,974[a]
≥10 times per moon	24 (35,8%)	11 (35,5%)	

[a]*Chi Square* [b]*Kruskal Wallis*

Based on the study program, the subjects in this study were mostly from non-surgical study programs compared to surgical study programs, namely 46 people (68,7%) who experienced TTH and 22 people (71,0%) who did not experience TTH. If the study program is described more specifically, in the surgical study program, the highest incidence of TTH was found in general surgery (11,9%) while the highest incidence without TTH was found in obgyn (16,1%).

Based on the work schedule, subjects with the number of work schedules of <10 times per month were found more in both the TTH group and without TTH group, namely 43 people (64,2%) and 20 people (64,5%) respectively. Meanwhile, those with the number of work schedules of ≥10 times per month, 24 people (35,8%) experienced TTH and 11 people (35,5%) did not experience TTH.

In this study, there was no significant correlation between demographic characteristics and the incidence of tension type headache based on sex (p= 0,178), age (p= 0,368), tribe (p= 0,581), marital status (p= 0,752), child ownership status (p= 0,442), study program (p= 0,817), and number of work schedules (p= 0,974).

Table 2. Frequency and Pain Intensity of Tension Type Headache and Stress Characteristics of Resident Doctors.

Characteristics	Average ±SD	Median (Min-Max)	Normality Test
TTH Frequency	3,88 ±4,578	1,00 (0 – 18)	P<0,001
Pain Intensity (NRS)	2,80 ±2,144	3,00 (0 – 6)	P<0,001
Fatigue (FSS)	33,16±11,483	32,50 (12-58)	p=0,200

In table 2, the mean frequency of TTH in the study subjects is 3,88 ± SD 4,578. Based on pain intensity, the average NRS in the study subjects was 2,80 ± SD 2,144. While the fatigue value measured by the average FSS value in the study subjects was 33,16 ± SD 11,483.

Table 3. Correlation between fatigue and frequency of Tension Type Headache.

	TTH Frequency
Fatigue (FSS)	r= 0,294 p= 0,003 n= 98

**Spearman* test

Based on the Spearman correlation test in this study (Table 3), there is a significant relationship between fatigue and TTH frequency with weak correlation strength (*r*= 0,294, p= 0,003).

Table 4. Correlation between Stress and Pain Intensity of Tension Type Headache.

	Pain Intensity (NRS score)
Fatigue (FSS)	r= 0,143 p=0,160 n= 98

**Spearman* test

Based on the Spearman correlation test in this study (Table 4), there was no relationship between fatigue status and pain intensity (*r*= 0,143, p = 0,160).

DISCUSSION

Tension type headache (TTH) is the most common headache, with approximately 1,89 billion people experiencing it. Data from the Global Burden of Disease (GBD) estimates that there were 882,4 million new cases of TTH in 2017.[3] In this study, the prevalence of TTH was higher than without TTH, which was 68,4%. In this study, TTH was experienced more by male residents (59,7%) compared to female residents (40,3%). This is in contrast to the statement of Shresta et al. (2021) argued that headaches are more dominant in women. Research conducted by Stovner (2022) found that the subjects who experienced TTH the most were women (27,1%) compared to men (23,4%).[1,2] This is thought to be because women have higher levels of anxiety, psychological disorders and depressive symptoms than men. Pain sensitivity is also much greater in women than men and also decreases activation of conditioned pain modulated analgesia. Differences in prevalence in women and men are also related to hormonal factors, contraceptive use, stress response, menopause and sleep quality.[10] Bhattarai et al. (2022) stated that although women were more likely to experience headaches than men, there was no significant difference in this regard (p= 0,516).[11] However, the results of this study where men were affected more than women could be due to the number of subjects in this study being more of male. This is similar to the statement in the study by Xie et al. (2020) which stated that the surgical residents studied were more male.[9]

In this study, most residents who experienced TTH were aged <30 years (58,2%). This is in accordance with the research of Haque et al. (2020) who found that the most age who suffered from TTH was 21-30 years old, as much as 58%.[12] Porst et al. (2020) said that the frequency of migraines and tension-type headaches decreases significantly with age.[13] In this study, there was no significant correlation between age and the incidence of TTH, which is in accordance with the study of Bhattarai et al (2022) which stated that there was no significant correlation between age and headache pain (p= 0,896).[11] However, this is in contrast to the study of Rongguang et al. (2023) where the main population suffering from headaches (Migraine and TTH) are those aged 40 to 44 years and specifically those who suffer from TTH are aged 70 to 74 years.[3]

In this study, subjects with TTH were mostly Batak (52,2%), married (61,2%), and already had children (56,7%). This is in accordance with the research of Wang et al. (2015) which investigated the incidence of

headaches in North China, where in their study married subjects experienced more TTH which was as many as 141 people than unmarried subjects as many as 127 people.[14] In another study, the research of Sertel et al. (2021) also found that 77,8% of women with TTH were married.[15] However, Bhattarai et al. (2022) stated that there was no significant correlation between marital status and the incidence of headaches (p= 1,000).[11] This is thought to be because subjects who are married and have children are usually encountered with various conflicts in work, marriage, social correlations, and psychosexual disorders.[16]

Based on the study program, the incidence of TTH was most commonly found in non-surgical study programs (68,7%) compared to surgical study programs (31,4%). However, this is different from the research of Xie et al. (2020), where TTH was found in many doctors from the surgical department (27,4%) but the study found no correlation between the doctor's specialization and the type of headache experienced (p> 0,05). This is in accordance with this study which found that there was an insignificant correlation between the study program and the incidence of TTH (p = 0,817).[9]

In a study conducted by Wang (2015) which investigated the prevalence of TTH in nurses where in his research it was found that subjects who experienced TTH were more in nurses who worked in the internal department than in the surgical department.[14] This could be due to differences in samples and the study subjects were carried out on the first semester residents who had not been involved in surgeries so they did not have full responsibility to the patients.

In this study, the majority of resident doctors who experienced TTH had a number of <10 night shift per month (64,2%). This is in contrast to the research by Alosaimi (2015) which stated that higher workloads and sleep deprivation caused by prolonged working hours damage circadian rhythms and are known to be the main causes that trigger fatigue in residents and increase fatigue scores.[6,7] This is thought to occur due to differences in the number of samples and the average number of patients and the number of duty teams in each different study program.

Based on the intensity of pain in the subjects of this study, the mean NRS was 3,2959 ± SD 2,0569. This is in accordance with the research of Mona Hasan et al. (2020) which found that the pain intensity in patients with TTH was mostly moderate pain, as much as 76%.[17]

In this study, subjects who experienced fatigue had a mean FSS value of 33,2041 ± SD 11,5758. This is not much different from the research of Sudira et al. (2018) which investigated resident doctors at Dr. Sardjito Hospital, showing a mean FSS value of 36,79 ± 11,15.18 In another study, namely Mahendrayana et al. (2021) showed the fatigue of resident doctors at H. Adam Malik Hospital Medan with a mean value of 33,71 ± 7,415.[19]

Based on the Spearman correlation test, this study found a significant relationship between fatigue status and TTH frequency with weak correlation strength (r= 0,295, p=0,003). This is in accordance with research conducted by Budianto et al. (2019), showing a significant correlation with a low correlation between TTH and fatigue (r= 0,293; p= 0,001).[20] In the study of Syamsah et al. (2022), it was also stated that there was a correlation between fatigue and the incidence of TTH (p= 0,013, OR: 5,20) where fatigue triggers changes in descending control of the trigeminal nerve which changes myofacial pain sensitivity and tension in the pericranial muscles as a cause of TTH.[21]

Fatigue independently mediates the relationship between pain intensity, sleep disturbances, depression, and psychological distress in pain disorders.[22] The study of Bansevicius et al (1999) who had a majority of chronic TTH also stated that there was a correlation between fatigue and pain intensity in TTH with a strong correlation (r= 0,70, p< 0,001).[23] This is in contrast to this study, there was no significant relationship between fatigue and pain intensity in TTH patients. This is due to the average frequency of TTH in this study subjects which is 3,88 ± 4,578.

The limitations in this study are that other predisposing factors such as the number of hours of sleep, responsibilities carried, socio-economic level, and level of depression which can affect the occurrence of TTH were not assessed in this study.

CONCLUSION

Based on the analysis of the data obtained from this study can be concluded that there was a significant relationship between fatigue status and TTH frequency with weak correlation strength (r= 0,294, p= 0,003). There was a unidirectional correlation between the two variables, thus the more severe a person's fatigue status, the more frequent the frequency of TTH is experienced. There was no significant relationship between fatigue and TTH pain intensity in first semester resident doctors with a p value of 0,160.

DECLARATIONS

Ethics approval and consent to participate. Permission for this study was obtained from the Ethics Committee of Universitas Sumatera Utara and Haji Adam Malik General Hospital.

CONSENT FOR PUBLICATION

The Authors agree to publication in Journal of Society Medicine.

FUNDING

This research has received no external funding.

COMPETING INTERESTS

None.

AUTHORS' CONTRIBUTIONS

All authors significantly contribute to the work reported, whether in the conception, study design, execution, acquisition of data, analysis, and interpretation, or in all these areas. Contribute to drafting, revising, or critically reviewing the article. Approved the final version to be published, agreed on the journal to be submitted, and agreed to be accountable for all aspects of the work.

ACKNOWLEDGMENTS

None

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