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The Relationship of Myofascial Trigger Points (MTrPs) Pain to Headache: Type, Location, and Intensity of Headache

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Abstract
Headaches are one of the most common nervous system disorders with a major impact on public health. They can be caused by various etiologies, and some of them are symptoms of serious pathology. The location and intensity of the headache are related to the etiology of the headache. In some cases, headaches can be accompanied by pain due to myofascial trigger points (MTrPs), which are small hyper-irritating spots located centrally within bands that have been injured or overworked. The purpose of this study was to determine the relationship between Myofascial Trigger Points (MTrPs) Pain and the Type, Location, and Intensity of Headaches. This type of research is analytic observational with a cross-sectional design. Data were collected in October and December of 2014, and a sample of 50 people was drawn using a consecutive sampling technique.Data were gathered through neurologists' history-taking and physical examinations, as well as interviews using a numerical pain scale (NPS), and then analyzed using Fisher and Mann Whitney.The results showed that MTrPs were positive for M. sternocleidomastoid in 38 people, M. trapezius in 36 people, M. temporalis in 31 people, M. masseter superficialis in 20 people, M. suboccipital in 18 people, M. levator scapulae in 34 people, and M. obliquus superior in 20 people. The highest number of active MTrPs was 4 in 15 people, and referred pain from MTrPs was present in only 5 people. It can be concluded that there is no relationship between Myofascial Trigger Points (MTrPs) pain and the type of headache, but there is a relationship between Myofascial Trigger Points (MTrPs) pain and the location and intensity of the headache.

Keywords: Headache; Trigger Point; Myofascial Trigger Points; Myofascial Trigger Points Pain; MTrPs;

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Introduction

Headaches are one of the most common nervous system disorders with a major impact on public health. One of the social impacts of headaches is that patients become ineffective in performing daily activities. In a study in the United Kingdom, 15% of the population experienced a decrease in work productivity due to headaches during the last three months, and 0.5-2% of all work absent lists were caused by headaches. It also shows the magnitude of the impact of headaches on people's performance and quality of life (Dermitzakis et al. 2010). Therefore, headaches are a major public health priority that urgently needs effective solutions (Steiner et al. 2011). The global incidence rate of headache disorders (at least once in the previous year) among adults aged 18–65 years is 47%, with 1.7–4% of them experiencing headaches for 15 days or more each month (Huynh et al. 2011). In fact, the percentage of headaches occupies the highest proportion in Indonesia, which is 42% of all neurological disorders experienced by patients. The prevalence of headaches in children and adolescents who persist into adulthood continues to increase, up to 50% of cases. The incidence of headaches in women is higher than in men, namely 20 million of the 45 million people with headaches are women (16.45%) (Rikerdas, 2013).

Headaches can be caused by various etiologies, and some of them are symptoms of serious pathology. The location and intensity of the headache are related to the etiology of the headache (Karada, G�l, and nan 2013). Based on the etiology, headaches are classified into primary headaches and secondary headaches (Indonesia 2005). Primary headaches according to the International Headache Society (IHS) classification are divided into several types, namely migraines, tension-type headaches (TTH), cluster headaches, and other trigeminal-autonomic cephalgias, as well as primary headaches and others (Indonesia 2005; Xu, Ge, and Arendt-Nielsen 2010). Of all these types of primary headache, the highest incidence of headache consultation at the primary and specialist level was migraine, TTH, and cluster headache (Huynh et al. 2011).

In some cases, headaches are often accompanied by palpable pain in the body. Pain that arises can be in the form of local pain located around the site of compression or referred pain that is felt at least 1 cm outside the local pain area (Xu, Ge, and Arendt-Nielsen 2010). The pain arises due to pressure on myofascial trigger points (MTrPs), which are small hyper-irritated spots located centrally within bands that have been injured or subjected to excessive and continuous (static) workloads (Bron and Dommerholt 2012; Kiralp et al. 2009). Pressure on these spots not only causes localized pain but also causes pain. with specific autonomic phenomena and sensory-motor dysfunction, but also radiates the pain to different areas of the body (Bron and Dommerholt 2012).

Areas that cannot be separated from the presence of MTrPs are the head and neck. The suppression of MTrPs, especially active ones, in this area contributes significantly to the pain experienced by patients, both acute and chronic, which is thought to cause various local disorders, such as headaches and mechanical pain in the neck (Fern�ndez-De-Las-Pe�as et al. 2011). This suggests that peripheral sensitization has a role in the pathophysiology of headache. In line with recent research from Karadas et al., who have also highlighted the importance of MTrPs in pain generation, which is believed to play a relevant role in triggering headaches (Karada, G�l, and nan 2013).

The results of other studies conducted by Fernandez et al. found that there was a positive correlation between the clinical parameters of headache and MTrPs, namely the duration of the headache, the high intensity of the headache, or the longer average duration of the headache, associated with the extent of the pain propagation area due to suppression of the MTrPs. This relationship is increasingly apparent with the number of studies, one of which is the study of Fernandez et al., which has proven that the inactivation of active MTrPs in muscles has been shown to be beneficial for relieving headaches (Fern�ndez-De-Las-Pe�as et al. 2011).

The purpose of this study was to determine the relationship between Myofascial Trigger Points (MTrPs) pain with each type of headache (in this case, primary headache) and the location of the headache and intensity.

Method

Time and Place of Research

This research was conducted in October-December 2014 at the neurology department of the Neurology Section of the dr. Zainoel Abidin (RSUDZA) Banda Aceh.

Study Sample

The total sample consisted of 50 patients aged 18–65 years with primary headache (migraine, tension-type headache (TTH), or cluster headache) with or without myofascial trigger points (MTrPs) pain.

The patient also had no hearing, vision, speech, sensory, motor, psychological, and cognitive impairments (all major complaints that could affect headaches) and no alcohol dependence, substance, or drug abuse.

Research procedure

Patients who met the inclusion and exclusion criteria were given a history and physical examination by a neurologist, and then the patients were interviewed using a numeric pain scale (NPS). The data obtained is then filled in on the patient data sheet and numerical pain scale (NPS).

The data is then processed by editing, coding, tabulating, and entering it into a computer program before being analyzed. Fisher and Mann Whitney data analysis with SPSS PASW Statistics 18 computer programs.

Research Result

The results of this study show the characteristics of the data listed in table 1, including gender, age, and occupation.

Characteristics	Frequency (n)	Percentage (%)
Gender		
Male	8	16
Female	42	84
Total	**50**	**100**
Age (Year)*		
Early adulthood (18-40)	37	74
middle adulthood (41-65)	13	26
Total	**50**	**100**
Profession **		
Housewife	19	38
Farmer	4	8
Trader	2	4
Private	3	6
Civil Servant	12	24
Student/Student	10	20
Total	**50**	**100**

Table 1: Data Characteristics

Table 1 above shows that the most common headaches are suffered by as many as 42 people (84%), in early adulthood (18–40 years), as many as 37 people (74%), and in the work of housewives, as many as 19 people (38%). The results of the study showing the frequency distribution of each research variable are described in the following table:

Location of Headache	Frequency (n)	Percentage (%)
Unilateral	8	16
Bilateral	7	14
Localized	2	4
Diffuse (complete)	33	66
Total	**50**	**100**

Table 2. frequency distribution and percentage of headache locations

Table 2 above shows that the most common headache locations are diffuse (overall), which affects 33 people (66%), while other headache locations, namely unilateral, affects 8 people (16%). Bilaterals lost up to 7 people (14%), and localized losses up to 2 people (4%).

Type Headache	Frequency (n)	Percentage (%)
Migraine	9	18
Tension-type Headache (TTH)	41	82
Cluster Headache	0	0
Total	**50**	**100**

Tabel 3. frequency distribution and percentage of Type Headache

Table 3 shows that the most common type of headache is tension-type headache (TTH) which affects 41 people (82%), while the other types of headaches, namely migraine, affect as many as 9 people (18%) and cluster headaches do not affect anyone (0%).

Intensity Headache Intensity	Frequency (n)	Percentage (%)
Mild	0	0
Moderate	10	20
Severe	40	80
Total	**50**	**100**

Table 4. Distribution of Frequency and Percentage of Headache

Table 4 above shows that the highest intensity of headache was severe intensity, suffered by 41 people (82%), while the intensity of other headaches, namely moderate intensity, suffered by 10 people (20%), and mild intensity, suffered by no one (0%).

Myofascial Trigger Points (MTrPs) Pain:	Frequency (n)	Percentage (%)
M. trapezius		
Positive	36	72
Negative	14	28
Total	**50**	**100**
M. sternocleidomastoideus		
Positive	38	76
Negative	12	24
Total	**50**	**100**
M. temporalis		
Positive	31	62
Negative	19	38
Total	**50**	**100**
M. masseter superficialis		
Positive	20	40
Negative	30	60

Total	**50**	**100**
M. suboccipitalis		
Positive	18	36
Negative	32	64
Total	**50**	**100**
M. levator scapulae		
Positive	34	68
Negative	16	32
Total	**50**	**100**
M. obliquus superior		
Positive	20	40
Negative	30	60
Total	**50**	**100**
Amount of Active MTrPs		
1	4	8
2	6	12
3	6	12
4	15	30
5	11	22
6	6	12
7	2	4
Total	**50**	100
Referred Pain		
Positive	5	10
Negative	45	90
Total	**50**	**100**

Table 4. Distribution of Frequency and Percentage *Myofascial Trigger Points (MTrPs) Pain*

Table 5 above shows that the Myofascial Trigger Points (MTrPs) pain was found in M. sternocleidomastoid, which suffered as many as 38 people (76%), while 12 people (24%) were negative. For MTrPs in other locations, namely MTrPs in M. trapezius suffered as many as 36 people (72%), MTrPs in M. temporalis suffered as many as 31 people (62%), MTrPs in M. masseter superficialis suffered as many as 20 people (40%), MTrPs suffered from M. suboccipital in 18 people (36%), MTrPs in M. levator scapulae in 34 people (68%) and MTrPs in M. obliquus superior in 20 people (40%).

The table also shows that the highest number of active MTrPs was 4 active MTrPs suffered by 15 people (30%), and referred pain was found in 5 people (10%), while 45 people (90%) had no pain at all.

Variable	Type Headache		Total	*p*-value
	Migrain	TTH		
MTrPs M.trapezius				
Positive	7	29	36	0,717
Negative	2	12	14	
Total	**9**	**41**	**50**	
MTrPs M.sternocleidomastoideus				
Positive	8	30	38	0,425
Negative	1	11	12	
Total	**9**	**41**	**50**	
MTrPs M.temporalis				
Positive	3	25	28	0,157
Negative	6	16	22	
Total	**9**	**41**	**50**	
MTrPs M.masseter superficialis				
Positive	5	17	22	0,481
Negative	4	24	28	
Total	**9**	**41**	**50**	
MTrPs M.suboccipitalis				
Positive	5	13	18	0,253
Negative	4	28	32	
Total	**9**	**41**	**50**	
MTrPs M.levator scapulae				
Positive	5	29	34	0,442
Negative	4	12	16	
Total	**9**	**41**	**50**	
MTrPs M.obliquus superior				
Positive	2	18	20	0,285
Negative	7	23	30	
Total	**9**	**41**	**50**	

Table 6. Fisher Location of Myofascial Trigger Points (MTrPs) Pain on Types of Headaches.

Table 6 above shows that MTrPs with positive values in all muscles were mostly found in the TTH type of headache compared to migraine headaches with the most positive MTrPs locations being M. Sternocleidomastoid which was found in 30 people with this type of headache. TTH and 8 people with migraine headaches.

The results of the analysis using Fisher after the data tested for normality were not normally distributed obtained a significance value of 0.425 (p > 0.05) which statistically showed that there was no significant relationship between MTrPs in M. sternocleidomastoid and the type of headache. The results of the analysis on other muscles also had a significance value of p > 0.05 so that statistically it could be concluded that there was no significant relationship between the location of MTrPs and the type of headache.

Variable	Type Headache		Total	*p*-value
	Migrain	TTH		
Referred Pain				
Positive	3	2	5	0,035
Negative	6	39	45	
Total	**9**	**41**	**50**	

Table 7. Fisher Referred Pain Test from Myofascial Trigger Points (MTrPs) Pain against Types of Headaches

Table 7 above shows that referred pain with a negative value is more common in the TTH type of headache compared to the migraine type, while the positive value is only found in 2 people with the TTH type of headache and 3 people with the migraine type of headache. The results of the analysis using Fisher after the data were tested for normality were not normally distributed, obtained a significance value of 0.035 (p < 0.05) which statistically indicated that there was a significant relationship between referred pain and the type of headache.

	N	**Mean**	***p*-value**
Number of active MTrPs in migraine group	9	26,22	0,882
Number of active MTrPs in TTH group	41	25,34	

Table 8. Mann-Whitney Number of Myofascial Trigger Points (MTrPs) Active on Types of Headaches

Table 8 above shows that the number of active MTrPs in the migraine headache type group, which amounted to 9 people, had an average of 26.22, while the number of active MTrPs in the TTH headache type group of 41 people had an average of 25.34. The results of the analysis using the Mann-Whitney after the data was tested for normality were not normally distributed. A significance value of 0.882 (p > 0.05) statistically showed that there was no significant relationship between the number of Myofascial Trigger Points (MTrPs) active with this type of headache.

Variable	Location of Headache		Total	*p*-value
	Diffuse	Non- *Diffuse*		
MTrPs M.Trapezius				
Positive	27	9	36	0,047
Negative	6	8	14	
Total	**33**	**17**	**50**	
MTrPs M.Sternocleidomastoideus				
Positive	22	16	38	0,039
Negative	11	1	12	
Total	**33**	**17**	**50**	
MTrPs M.Temporalis				
Positive	22	6	28	0,042
Negative	11	11	22	
Total	**33**	**17**	**50**	
MTrPs M.Masseter Superficialis				
Positive	11	11	22	0,042
Negative	22	6	28	
Total	**33**	**17**	**50**	
MTrPs M. Suboccipitalis				
Positive	8	10	18	0,028
Negative	25	7	32	
Total	**33**	**17**	**50**	
MTrPs M.Levator Scapulae				
Positive	26	8	34	0,030
Negative	7	9	16	
Total	**33**	**17**	**50**	
MTrPs M.Obliquus Superior				
Positive	17	3	20	0,032
Negative	16	14	30	
Total	**33**	**17**	**50**	

Table 9. Fisher Location of Myofascial Trigger Points (MTrPs) Pain on Headache Location

Table 9 above shows that the most positive MTrPs were found at the location of M. trapezius diffuse headache, which was 27 people, while the other 9 people were positive at the location of the non-diffuse headache, not comprehensive, unilateral, bilateral, or localized). The other muscle, namely M. masseter superficialis, had positive MTrPs with the same value at both diffuse and non-diffuse, while M. suboccipital had more positive MTrPs at non-diffuse headache locations than at diffuse.

The results of the analysis using Fisher headache. diffuse (overall) compared non-diffuse headache locations to diffuse and non-diffuse and 0.028 ($p < 0.05$) for MTrPs M. suboccipital, which statistically shows that there is a significant relationship between MTrPs M. suboccipital and the location of non-diffusive headache diffuse compared to headache. The results of the analysis on other muscles also had a significant value of $p < 0.05$ so that, statistically, it could be concluded that there was a significant relationship between the location of the MTrPs and the location of the headache..

Variable	Location of Headache		Total	*p*-value
	Diffuse	Non-*Diffuse*		
Referred Pain				
Positive	0	5	5	0,003
Negative	33	12	45	
Total	**33**	**17**	**50**	

Table 10. Results of the Fisher Referred Pain from Myofascial Trigger Points (MTrPs) Pain to Headache Location

Table 10 above shows that referred pain was diffuse, which was 33 people, while positive values were only found at the location of the diffused pain, which was as many as 5. The results of the analysis using Fisher after the data were tested for normality were not normally distributed, obtained a significance value of 0.003 ($p < 0.05$) which statistically indicated that there was a significant relationship between referred pain and the location of the headache.

	N	**Mean**	***p*-value**
Number of active MTrPs in diffuse	33	26,41	0,530
Number of active MTrPs in non-diffuse	17	23,74	

Table 11. Mann-Whitney Number of Myofascial Trigger Points (MTrPs) Active to the location of the headache

Table 11 above shows that the number of active MTrPs in the group of diffuse headache locations (overall), which amounted to 33 people, had an average of 26.41, while the number of active MTrPs in the group of non-diffuse headache locations (unilateral, bilateral, or localized), amounted to 17 people, with a mean of 23.74. The results of the analysis using the Mann-Whitney test after the data was tested for normality were not normally distributed. A significance value of 0.530 (p > 0.05) statistically showed that there was no significant relationship between the number of Myofascial Trigger Points (MTrPs) active pain and the location of the pain head.

Variable	Intensity Headache Intensity		Total	*p*-value
	Middle	Heavy		
MTrPs M.Trapezius				
Positive	8	28	36	0,704
Negative	2	12	14	
Total	**10**	**40**	**50**	
MTrPs M.Sternocleidomastoideus				
Positive	2	36	38	0,000
Negative	8	4	12	
Total	**10**	**40**	**50**	
MTrPs M.Temporalis				
Positive	0	28	28	0,000
Negative	10	12	22	
Total	**10**	**40**	**50**	
MTrPs M.Masseter Superficialis				
Positive	1	21	22	0,029
Negative	9	19	28	
Total	**10**	**40**	**50**	
MTrPs M.Suboccipitalis				
Positive	0	18	18	0,009
Negative	10	22	32	
Total	**10**	**40**	**50**	
MTrPs M.Levator Scapulae				
Positive	2	32	34	0,001

Negative	8	8	16	
Total	**10**	**40**	**50**	
MTrPs				
M.Obliquus Superior				
Positive	5	15	20	0,720
Negative	5	25	30	
Total	**10**	**40**	**50**	

Table 12. Fisher Location of Myofascial Trigger Points (MTrPs) Pain to Headache Intensity

Table 12 above shows that the most positive MTrPs in all muscles were found in severe headache intensity compared to moderate headache intensity, with the most positive MTrPs locations being M. sternocleidomastoid, as many as 36 people with severe headache intensity and 2 people with moderate headache intensity, while the negative value was spread across four people with severe headache intensity and eight people with moderate headache intensity.

The results of the analysis using Fisher after the data was tested for normality were not normally distributed, obtained a significance value of 0.000 ($p < 0.05$) which statistically showed that there was a significant relationship between MTrPs in M. sternocleidomastoid and headache intensity. The results of the analysis on the other four muscles also had a significance value of $p < 0.05$ so that statistically it can be concluded that there is a significant relationship between the location of the MTrPs and the intensity of headache, although the results of the analysis on the other two muscles, namely M. trapezius and M. obliquus superior, had a significance value of p > 0. 05.

Variable	Intensity Headache Intensity		Total	*p*-value
	Middle	Heavy		
Referred Pain				
Positive	0	5	5	0,569
Negative	10	35	45	
Total	**10**	**40**	**50**	

Table 13. Fisher's Referred Pain from Myofascial Trigger Points (MTrPs) Pain with Headache Intensity

Table 13 above shows that referred pain with negative values is more common in severe headache intensity compared with moderate headache intensity, as many as 35 people at severe headache intensity and 10 people at moderate headache intensity, while the positive value was 5 people at severe headache intensity and none at moderate headache intensity. The results of the analysis using Fisher after the data were tested for normality were not normally distributed, obtained a significance value of 0.569 (p > 0.05) which statistically indicated that there was no significant relationship between referred pain and headache intensity.

	N	Mean	*p*-value
Number of active MTrPs in moderate-intensity group	10	7,75	0,000
Number of active MTrPs in heavy intensity group	40	29,94	

Table 14. Mann-Whitney Number of Myofascial Trigger Points (MTrPs) Active on Headache Intensity

Table 14 above shows that the number of active MTrPs in the moderate headache intensity group of 10 had an average of 7.75, while the number of active MTrPs in the severe headache intensity group of 40 had an average of 29.94. The results of the analysis using the Mann-Whitney after the data tested for normality are not normally distributed, a significance value of 0.000 (p <0.05) is obtained, which statistically shows that there is a significant relationship between the number of Myofascial Trigger Points (MTrPs) active with headache intensity.

Discussion

The results of the data analysis in table 1 state that the female gender suffers from headaches more, which means 42 people (84%) compared to men, which only amounts to 8 people (16%). The results of this analysis are in line with the study of the prevalence of primary headache disorders in the older age group, namely in people aged 55–94 years, based on the second edition of the International Classification of Headache Disorders (ICHD-2). It reported that the one-year prevalence of primary headache disorders is higher for women (47.6%) compared to men (31.9%) (Schwaiger et al. 2009). This statement is also supported by a one-year prevalence study conducted by the American Migraine Prevalence and Prevention (AMPP) that reported the same thing, namely the prevalence of migraine in people aged 60 years and older. 6.4% were women and 2.1% were men. In the study by Bruneck et al., the prevalence of migraine at the age of 55–94 years was 7.8% in women and 3.2% in men (Schwaiger et al. 2009). Research conducted by Necdet Karli et al. stated that women suffer from headaches more than men and can be caused by hormonal factors that change when taking oral contraceptives, menstruation, pregnancy, and menopause, including the hormones estrogen and progesterone, which transmit pain through central and peripheral sensitization with serotonergic, nonadrenergic, and glutamatergic neurotransmitter systems, as well as GABA and opioidergic (Karl et al. 2012; Lieba-Samal and W�ber 2011).

Headaches are mostly suffered in early adulthood (18–40 years), which affected 37 people (74%). This is in line with a study in Thessaloniki (Greece) which reported that there were 851 primary headache patients aged 50 years and 197 primary headache patients aged ≥50 years (Dermitzakis et al. 2010). The study conducted by Omer Karadas et al. also stated that the prevalence of TTH in the 2nd to 5th decades of life was highest between the ages of 30 and 40 years (Karada, G�l, and nan 2013).

Headaches based on the occupation of the research subjects suffered the most in the work of housewives, as many as 19 people (38%). One of the factors that can cause this is stress. This is in line with research conducted by Komalah Chenasammy who reported that stress can cause headaches in someone who is faced with work demands and pressures that do not match their knowledge and skills, thus making their ability to cope with them a problem. Stress can also occur in someone who has a heavy workload, a very high work speed, or works at a very tight time (Chenasammy 2010). In addition to stress, headaches in housewives can also be caused by an increase in muscle work that causes a lot of stress. MTrPs are active and sensitize headaches. Research conducted by Veni Fatmawati reported that workers who usually work with lifting, shifting, pushing, hoeing, plowing, and writing activities often complain of neck pain due to an increase in active MTrPs in M. trapezius which also plays a role in causing headaches (Fatmawati 2013). The same was reported in a study conducted by Amparo Hidalgo-Lozano et al. that people who work with their upper arms and shoulders more than one hour per day, as well as people who work by typing, lifting, or driving, have a significant relationship with the onset of pain in the shoulder, neck, and head (Hidalgo-Lozano et al. 2010; Hoyle et al. 2011).

The location of the most headaches in table 2 is diffuse (comprehensive) suffered by as many as 33 people (66%). This is in line with the research conducted by Cesar Fernandez-de-las-Penas et al. who reported that both migraine headaches and TTH were often perceived as generalized headaches. This is related to the presence of active MTrPs in the muscles of the head and neck that transmit pain to the head so that the pain is felt from various sides and is considered as generalized pain (Schwaiger et al. 2009). Another study conducted by Andrea L. Nicol et al. stated that migraines are generally unilateral, which at any time can progress to bilateral to generalized, while TTH is generally bilateral which is often followed by a feeling of a burden on the top of the head or a strong pressure that surrounds the entire head so that pain in migraine and TTH can be felt all over. head section (Nicol, Hammond, and Doran 2013).

The results of data analysis in table 3 state that the most common type of headache is TTH, which is suffered by 41 people (82%). This is in line with the research of

Bendtsen et al. who reported that TTH was the primary headache with the highest prevalence (Ashina, Bendtsen, and Ashina 2012). The study conducted by Cesar Fernandez-de-las-Penas et al. also reported the same thing, namely TTH is the type of headache that mostly affects adults and the elderly (Fern�ndez-De-Las-Pe�as et al. 2011). This is further strengthened by another study conducted by Cesar Fernandez-de-las-Penas et al. who reported that the highest prevalence of primary headache cases was TTH, which was 38.3% (Fern�ndez-de-Las-Pe�as et al. 2010). In another study in the emergency department, the highest diagnostic frequency of primary headache was TTH with 33.6% of cases, while migraine was only 15.4% (Dermitzakis et al. 2010).

The highest intensity of headache in table 4 is severe intensity suffered by 41 people (82%). This is in accordance with the research of Andrea l. Nicol et al. reported that migraine has a moderate to severe headache intensity, whereas TTH has a mild to moderate headache intensity but in poor conditions, the headache will be felt as very severe pain. It should be emphasized that pain is subjective so that the perception of mild, moderate, or severe pain depends on what the patient feels (Nicol, Hammond, and Doran 2013). This study is in line with the National Consensus III for Diagnostics and Management of Headaches which states that TTH has a lighter headache intensity than migraine. or cluster headaches but the characteristics of the pain felt by each person can be different so it is not impossible that TTH is felt as a severe headache (Indonesia 2005).

The results of data analysis in table 5 state that the Myofascial Trigger Points (MTrPs) Pain is M. sternocleidomastoid which suffered by 38 people (76%) followed by M. trapezius which suffered by 36 people (72%). This is in accordance with the research of Bendtsen et al. who reported that in TTH the prevalence of MTrPs was mostly found in the cervical muscles, namely M. sternocleidomastoid. Although many other studies reported that more active MTrPs were found in M. trapezius than M. sternocleidomastoid (Bendtsen et al. 2010). The study conducted by Cesar Fernandez-de-las-Penas et al. provided other information that active and latent MTrPs were found in M. trapezius and M. sternocleidomastoid precisely on the dominant side causing head, neck, and shoulder pain. The high prevalence of MTrPs on the dominant side may be related to the fact that on average people use their right hand to do work or repetitive hand movements (Fern�ndez-de-Las-Pe�as et al. 2010). The table also shows that the highest number of active MTrPs was 4 active MTrPs suffered as many as 15 people (30%), Research conducted by Cesar Fernandez-de-las-Penas et al. reported that the number of active MTrPs will affect the intensity and frequency of headache (Fern�ndez-de-Las-Pe�as et al. 2010). In addition, the results of the analysis of the data in the table stated that referred pain from MTrPs was only positive in 5 people (10%), while 45 people (90%). %) others are negative. Research conducted by Cesar Fernandez-de-las-Penas et al. TTH patients reported that in fact referred pain from active MTrPs in the M. suboccipital, M. trapezius, M. temporalis, M. superior obliquus, and M. sternocleidomastoid produces TTH headaches that can be felt all over the head (diffuse). The referred pain phenomenon of active MTrPs is associated with central sensitization. The extent of the referred pain area is also related to the intensity of the pain produced, but not all referred pain can be seen when the muscle examination is carried out (Fern�ndez-de-Las-Pe�as et al. 2010). Processing the data in table 6 using test Fisher after the data tested for normality not normally distributed, the significance values are as follows; 0.717 (p > 0.05) for MTrPs M. trapezius, 0.425 (p > 0.05) for MTrPs M. sternocleidomastoid, 0.157 (p > 0.05) for MTrPs M. temporalis, 0.481 (p > 0.05) for M. masseter superficial, 0.253 (p > 0.05) for MTrPs M. suboccipital, 0.442 (p > 0.05) for MTrPs M. levator scapulae, and 0.285 (p > 0.05) for MTrPs M. obliquus superior which statistically showed that there was no significant relationship between MTrPs M. trapezius, MTrPs M. sternocleidomastoid, MTrPs M. temporalis, MTrPs M. masseter superficial, MTrPs M. suboccipital, MTrPs M. levator scapulae, and MTrPs M. obliquus superior with type of headache. This is not in line with the results obtained by Cesar Fernandez-de-las-Penas et al. in TTH patients who reported that there was a significant association between MTrPs M. trapezius, MTrPs M. sternocleidomastoid, MTrPs M. temporalis, MTrPs M. masseter superficial, MTrPs M. suboccipital, MTrPs M. levator scapulae, and MTrPs M. obliquus superior with type headache which in this case is TTH. In this study, the significance values were obtained as follows; 0.001 (p < 0.05) for MTrPs M. trapezius, 0.001 (p < 0.05) for MTrPs M. sternocleidomastoid, 0.001 (p < 0.05) for MTrPs M. temporalis, 0.008 (p < 0.05) for M. masseter superficial, 0.001 (p < 0.05) for MTrPs M. suboccipital, 0.012 (p < 0.05) for MTrPs M. levator scapulae, and 0.009 (p < 0.05) for MTrPs M. obliquus superior which statistically showed that there was a significant relationship between MTrPs M. trapezius, MTrPs M. sternocleidomastoid, MTrPs M. temporalis, MTrPs M. masseter superficial, MTrPs M. suboccipital, MTrPs M. levator scapulae, and MTrPs M. obliquus superior with type headache (Fern�ndez-De-Las-Pe�as et al. 2011). Differences in the results of these studies can be caused by various factors, including; differences in the statistical analysis used, differences in the distribution of data in the two studies, differences in the characteristics of the study samples, and differences in the types of headaches associated with the two studies. Research conducted by Cesar Fernandez-de-las-Penas et al. only examined the relationship of MTrPs on TTH, while this study examined the relationship of MTrPs on TTH and migraine.

Table 7 shows the results of the analysis of referred pain to the type of headache using Fisher after the data was tested for normality and was not normally distributed, namely a significance value of 0.035 (p < 0.05) which statistically indicated that there was a significant relationship between referred pain and the type of headache. The results of this study are in line with the results obtained by Cesar Fernandez-de-las-Penas et al. in TTH patients using the ANOVA test. A significance value of 0.008 (p < 0.05) was obtained, which statistically indicated that there was a significant relationship between referred pain and the type of headache (Fern�ndez-De-Las-Pe�as et al. 2011). Simons et al. stated that referred pain from active MTrPs acquired in the muscles around the head can radiate to all parts of the head and is generally a bilateral headache, although sometimes a severe headache can occur all over the head. Gerwin et al. also stated that primary headaches, such as TTH, migraine, or cluster headaches, are so closely associated with referred pain from MTrPs that are present in the head, neck, and shoulder muscles that mediate the spinal nerves and the trigeminal nucleus caudalis can cause pain on direct compression. pericranial muscles (Fern�ndez de las Pe�as et al. 2006).

Processing the data in table 8 using the Mann-Whitney test, after the data was tested for normality and found not to be normally distributed, a significance value of 0.882 ($p > 0.05$) statistically showed that there was no significant relationship between the number of myofascial trigger points (MTrPs) active with this type of headache. The results of this study are in line with the results obtained by Cesar Fernandez-de-las-Penas et al. in TTH patients using the Chi-Square (x2), which obtained a significance value of 0.500 ($p > 0.05$) which statistically showed that there was no significant relationship between the number of Myofascial Trigger Points (MTrPs) active with this type of headache. In this study, MTrPs can cause various perceptions of headaches, both in small and large amounts. The extent of the headache produced depends on the extent of referred pain (referred pain) MTrPs (Fern�ndez de las Pe�as et al. 2006). This is in line with the results of the study by Omer Karadas et al. who reported that the location and number of MTrPs varied greatly in primary headache patients (Karada, G�l, and nan 2013).

Processed the data in Table 9 using Fisher after the data was tested for normality. not normally distributed, the significance values are as follows; 0.047 ($p < 0.05$) for MTrPs M. trapezius, 0.039 ($p < 0.05$) for MTrPs M. sternocleidomastoid, 0.042 ($p < 0.05$) for MTrPs M. temporalis, 0.042 ($p < 0.05$) for M. masseter superficial, 0.028 ($p < 0.05$) for MTrPs M. suboccipital, 0.030 ($p < 0.05$) for MTrPs M. levator scapulae, and 0.032 ($p < 0.05$) for MTrPs M. obliquus superior which statistically showed that there was a significant relationship between MTrPs M. trapezius, MTrPs M. sternocleidomastoid, MTrPs M. temporalis, MTrPs M. masseter superficial, MTrPs M. suboccipital, MTrPs M. levator scapulae, and MTrPs M. obliquus superior with location headache. The results of this study are in line with those of Cesar Fernandez-de-las-Penas et al. in TTH patients who reported a significant association between MTrPs M. trapezius, MTrPs M. sternocleidomastoid, MTrPs M. temporalis, MTrPs M. masseter superficialis, MTrPs M. suboccipitalis, MTrPs M. levator scapulae, and MTrPs M. obliquus superior with the location of the headache. In this study, the significance values were obtained as follows; 0.001 ($p < 0.05$) for MTrPs M. trapezius, 0.012 ($p < 0.05$) for MTrPs M. sternocleidomastoid, 0.001 ($p < 0.05$) for MTrPs M. temporalis, 0.022 ($p < 0.05$) for M. masseter superficialis, 0.001 ($p < 0.05$) for MTrPs M. suboccipitalis, 0.012 ($p < 0.05$) for MTrPs M. levator scapulae, and 0.005 ($p < 0.05$) for MTrPs M. obliquus superior. The study stated that both local and referred pain from MTrPs diagnosed by manual palpation can produce pain with a characteristic pattern so that it can be felt at different locations (Fern�ndez-De-Las-Pe�as et al. 2011). This is in line with research conducted by Gema Bodes. -Pardo et al. state that active MTrPs with localized and radiating pain can produce pain symptoms in the surrounding area, such as headaches in different locations, so it is no longer surprising that MTrPs are widely reported in cases of primary headaches, such as TTH, migraine, and cluster headaches. This is further strengthened by research conducted by Omer Karadas et al. who reported that the location of MTrPs in primary headache patients varied. The M. trapezius, M. suboccipitalis, and M. sternocleidomastoid are the muscles with the most MTrPs that play a role in determining the characteristics of the resulting headache, such as location, frequency, and intensity (Karada, G�l, and nan 2013).

Table 10 shows the results of the referred pain. on the location of the headache using Fisher after the data tested for normality were not normally distributed, namely a significance value of 0.003 ($p < 0.05$) which statistically indicated that there was a significant relationship between referred pain and the location of the headache. . The results of this study are in line with those of Cesar Fernandez-de-las-Penas et al. in TTH patients using the A 3-way ANOVA test, which obtained a significance value of 0.013 ($p < 0.05$) which statistically indicated that there was a significant relationship between referred pain. with the location of the headache. The study reported that the combination of pain propagation patterns generated by active MTrPs constitutes the overall pattern of spontaneous pain in primary headaches, including TTH. TTH arises from the transmission of MTrPs pain located in the head, neck, and shoulders. This is supported by many other studies reporting that pain transmission from active MTrPs in the suboccipital M, trapezius, temporalis, superior oblique, and sternocleidomastoid muscles result in TTH headaches with bilateral to diffuse (Fern�ndez-De-Las-Pe�as et al. 2011).

Processing the data in table 11 using the Mann-Whitney after the data tested for normality were not normally distributed, a significance value of 0.530 ($p > 0.05$) statistically showed that there was no significant relationship between the number of Myofascial Trigger Points (MTrPs) Pain is active with the location of the headache. The results of this study are in line with those of Cesar Fernandez-de-las-Penas et al. in TTH patients using the same test, which obtained a significance value of 0.090 ($p > 0.05$) which statistically showed that there was no significant relationship between the number of Myofascial Trigger Points (MTrPs) active with the location of the headache.(10) The study conducted by Elena P Calandre et al. reported that the mechanism underlying the presence of active MTrPs in each primary headache is the same, namely chronic pain and recurrent acute pain sensitizing muscular nociceptors and forming MTrPs that have the potential for headache onset. Headaches can have the same number of active MTrPs with different headache locations or different numbers of active MTrPs with the same headache location so that the number of active MTrPs is not affected by the location of the headache, but rather by the underlying mechanism (Xu, Ge, and Arendt-Nielsen 2010).

Data processing on Table 12 using Fisher's exact test after the data tested for normality were not normally distributed, the significance values were obtained as follows; 0.704 ($p > 0.05$) for MTrPs M. trapezius, 0.000 ($p < 0.05$) for MTrPs M.

sternocleidomastoid, 0.000 ($p < 0.05$) for MTrPs M. temporalis, 0.029 ($p < 0.05$) for M. masseter superficial, 0.009 ($p < 0.05$) for MTrPs M. suboccipital, 0.001 ($p < 0.05$) for MTrPs M. levator scapulae, and 0.720 ($p > 0.05$) for MTrPs M. obliquus superior which statistically showed that there was a significant relationship between MTrPs M. sternocleidomastoid, MTrPs M. temporalis, MTrPs M. masseter superficial, MTrPs M. suboccipital, and MTrPs M. levator scapulae with headache intensity, while between MTrPs M. trapezius and MTrPs M. obliquus superior with headache intensity there is no significant relationship. The results of this study are in line with those of Cesar Fernandez-de-las-Penas et al. in TTH patients who reported that there was a significant association between MTrPs M. sternocleidomastoid, MTrPs M. temporalis, MTrPs M. masseter superficial, MTrPs M. suboccipital, and MTrPs M. levator scapulae with headache intensity, whereas, in MTrPs M. trapezius and MTrPs M. obliquus superior, the results of this study are not in line. In this study, the following significance values were obtained; 0.000 ($p < 0.05$) for M. trapezius MTrPs, 0.001 ($p < 0.05$) for M. sternocleidomastoid MTrPs, 0.001 ($p < 0.05$) for M. temporalis MTrPs, 0.005 ($p < 0.05$) for M. masseter superficial, 0.001 ($p < 0.05$) for MTrPs M. suboccipital, 0.026 ($p < 0.05$) for MTrPs M. levator scapulae, and 0.005 ($p < 0.05$) MTrPs M. obliquus superior statistically showed that there was a significant relationship between MTrPs M. trapezius, MTrPs M. sternocleidomastoid, MTrPs M. temporalis, MTrPs M. masseter superficial, MTrPs M. suboccipital, MTrPs M. levator scapulae, and MTrPs M. obliquus superior with pain intensity. head. The study stated that between the areas of spontaneous pain from stimulation of MTrPs, both on the dominant and non-dominant side and the intensity of headache, there was a significant relationship, namely the more active MTrPs, the wider the area of spontaneous pain on the dominant and non-dominant sides which made the pain intensity. the head is getting higher (Fern�ndez-De-Las-Pe�as et al. 2011). This is in line with research conducted by Elena P Calandre et al. who reported that active MTrPs were associated with the severity and duration of headaches described in TTH headaches and that repeated inactivation of active MTrPs using anesthetic injections demonstrated a reduction in the severity and frequency of headaches (Xu, Ge, and Arendt-Nielsen 2010). Another study conducted by Omer Karadas et al. stated that MTrPs play an important role in the perception of the severity of headache through sensitization of neurons in the caudal trigeminal nucleus that receives input from cerebral blood vessels and pericranial muscles (Karada, G�l, and nan 2013). Research conducted by Marzieh Mohamadi et al. stated the same thing those headache parameters (intensity, duration, and frequency) were obtained in higher numbers in TTH headaches with trigger points in the head and neck muscles compared to without trigger points (Mohamadi and Ghanbari 2012). This is different from the results of the study obtained by Danit Tali. et al. who reported that there was no relationship between the number of active MTrPs and headache intensity. The significance value in this study was 0.067 ($p > 0.05$) which is in line with the results of MTrPs data processing on M. trapezius and M. obliquus superior (Tali et al. 2014).

Table 13 shows the results of the analysis of referred pain on the intensity of headache using Fisher after the data were tested for normality not normally distributed, ie a significance value of 0.569 ($p > 0.05$) was obtained which statistically indicated that there was no significant relationship between referred pain and headache intensity. The results of this study are in line with the results obtained by Necdet Karli et al. using the same test, which obtained a significance value of 0.086 ($p > 0.05$) which statistically indicates that there is no significant relationship between referred pain and headache intensity. conducted by Cesar Fernandez-de-las-Penas et al. in TTH patients using the 2-way ANOVA test, a significance value of 0.007 ($p < 0.05$) was obtained which statistically indicated that there was a significant relationship between referred pain and headache intensity. The study stated that the area of referred pain from several positive muscles was associated with several clinical parameters of headache, including the wider referred pain caused by active MTrPs, the higher the headache intensity (Fern�ndez-De-Las-Pe�as et al. 2011). The difference in the results of these studies could be due to various factors, including; differences in the statistical analysis used, differences in the distribution of data in the two studies, differences in the characteristics of the study samples, and differences in the types of headaches associated with the two studies.

Processing the data in table 14 using the Mann-Whitney after the data tested for normality is not normally distributed, a significance value of 0.000 ($p <0.05$) is obtained which statistically shows that there is a significant relationship between the number of Myofascial Trigger Points (MTrPs) Pain active with headache intensity. The results of this study are in line with the results obtained by Cesar Fernandez-de-las-Penas et al. in TTH patients using the same test, which obtained a significance value of 0.001 ($p > 0.05$) which statistically indicates that there is a significant relationship between the number of Myofascial Trigger Points (MTrPs) active with headache intensity. The study stated that the higher the number of active MTrPs, the higher the intensity of the headache (Fern�ndez-De-Las-Pe�as et al. 2011). This is supported by another study conducted by Sait Ashina et al. in migraineurs and TTH patients who stated that an increase in the number of MTrPs in the muscles around the head can affect the duration and intensity of headache (Ashina, Bendtsen, and Ashina 2012).

Conclusion

There was no significant relationship between myofascial trigger points (MTrPs) pain and the type of headache, but there was a significant relationship between myofascial trigger points (MTrPs) pain with the location of the headache and the intensity of the headache. In addition, the incidence of headaches accompanied by myofascial trigger points (MTrPs) pain is very high; all study subjects positively experience headaches accompanied by myofascial trigger points (MTrPs) pain.

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