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PREVALENCE OF MYOFASCIAL TRIGGER POINTS IN NON-SPECIFIC NECK OR SHOULDER PAIN AMONG UNIVERSITY STUDENTS

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MANOJ ABRAHAM MANOHARLAL[1], Lum Jer Shin[2], Sara Teng Lee Cardoso[3],Soh Yaw Yin[4]

Corresponding Author:

[1]Lecturer, Department of Physiotherapy, Faculty of Medical and Health Sciences (FMHS), Universiti Tunku Abdul Rahaman (UTAR), Bandar Sungai Long, Cheras, Kajang, 43000, Selangor, Malaysia.

Email: manojpt3@gmail.com

Co-Authors:

[2, 3, 4] Physiotherapy Students, Universiti Tunku Abdul Rahaman (UTAR), Bandar Sungai Long, Cheras, Kajang, Selangor, Malaysia.

Abstract

Background and Objectives: *A high prevalence of non-specific neck or shoulder pain exists among university students. A few studies had been conducted in Malaysia to study the prevalence and possible risk factors associated with non-specific neck pain among college students. The purposes of this study were to study the prevalence, the anatomical locations and disability grading of myofascial trigger points in non-specific neck or shoulder pain among university students.* ***Methods:*** *A cross-sectional study was conducted. Subjects were selected according to the screening questionnaires. Eligible subjects were examined. Disability levels of the subjects were graded using Neck Disability Index (NDI) and Shoulder Pain and Disability Index (SPADI). MTrPs palpations were done on 6 anatomical locations to locate MTrPs. Flat palpation technique and pincer palpation techniques were used.* ***Results:*** *Among 350 participants, 59.7% participants reported having neck or shoulder pain. Out of 208 participants, 51% participants were having MTrPs with non-specific neck or shoulder pain. In general, both left and right upper trapezius showed the highest percentage of MTrPs which are 94.79% (n=91) respectively, followed by right neck extensors72.97% (n=70) and both left and right levator scapulae63.54 %(n=61). According to disability grading of NDI and SPADI, most subjects showed low levels of associated disability.* ***Conclusions:*** *A high prevalence (51%) of MTrPs with non-specific neck or shoulder pain existed among university students. Upper trapezius, neck extensor and levator scapulae were found to be the muscles that prone to develop MTrPs. Majority of the participants (62.5%) fell under the category of mild disability.*

Keywords: *Prevalence, Myofascial Trigger Points, Non-specific neck or shoulder pain*

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INTRODUCTION

Neck and shoulder pain are known to be one of the leading causes for musculoskeletal disorders, secondary only to low back pain[1]. It has developed into a serious problem around the globe and can cause tremendous impact on individuals as well as to the surrounding communities have reported that the 1 year prevalence of neck pain ranges from 4.8% to 79.5%[2].

Prevalence of both neck and shoulder pain are found to be higher among women than men[4]. It was also reported that the prevalence for neck pain is higher in high-income countries as well as in the urban areas[2]. With the advancement of new technologies in computer and smartphone, the prevalence of neck and shoulder pain has been on the rise[4]. This dramatic increase in prevalence of neck or shoulder pain can greatly decrease the productivity of the society[5, 6], resulting in a dramatic impact to the nation in terms of financial damage[7]. Non-specific neck and shoulder pain are known as 'mechanical neck pain' and 'mechanical shoulder pain'. It refers to neck pain and shoulder pain without any specific underlying pathology such as fracture, dislocation, neoplasm, disc disease, degeneration or systemic disease (William, 2013).Studies have shown a high prevalence of upper extremity pain among adults working in sedentary occupations[8]. Musculoskeletal complaint rates are high among those performing low-level static exertions, such as computer users[9].

Prevalence of musculoskeletal symptoms in the neck and upper extremities among students has also been linked with a high increase of computer usage[10], and visual demands may be one of the contributing factors[11]. During the past few decades, myofascial trigger points (MTrPs) have received much attention in the scientific and clinical literature. It was hypothesized that MTrPs development might be one causal mechanism to help explain musculoskeletal complaints. Studies suggested that musculoskeletal conditions that cannot be classified by existing diagnostic tests or those who do not respond to treatments are hypothesized to be related withMTrPs. This hypothesis was supported by other authors stating that some cases of neck and upper back pain could have been attributed to the development of MTrPs over a specific region. Studies proposed that pain that originates from MTrPs or better known as myofascial pain syndrome is among the most frequent pain conditions encountered in the general population[11, 12, 13]. These symptoms are believed to exacerbate after prolonged static muscle activity or insistent job tasks resulting in muscle metabolic disturbances[14, 15, 16].

Background of the study

MTrP is a "hyperirritable spot in skeletal muscle that is associated with formation of hypersensitive palpable nodule in a taut band. This spot is painful on compression and can give rise to characteristic referred pain, tenderness, motor dysfunction and autonomic phenomena". MTrP develops when there is localized shortening of a fascicle of muscle fibers. These shortened muscles will then lead to persistent and non-relieving contraction and can be felt through palpation as an indurated "taut band"[17]. Taut band can be detected more easily by palpation technique compared to a trigger point. The taut strand of muscle fibres in the muscle is described to be felt like a cord that extends from the trigger point in both directions. It has been found that a taut band can limit the muscle's ability to lengthen and has the ability to restrict the range of motion of a joint.

MTrP are activated directly by muscle overuse, fatigue, direct or repetitive trauma and chills. Once MTrPs are activated there will be an increase in amount of acetylcholine released at the motor end plate. ACh will then trigger the release of ionized calcium from the sarcoplasmic reticulum which is not reabsorbed and causes further contraction of myo-filaments of the muscles. This contraction of the myo-filaments will apply a traction force on the motor nerves and cause pain. After that, pain mediators are released into the site thereby causing more pain. This whole process is known as a vicious cycle.

A cohort study conducted among undergraduate students has concluded that 46% of subjects developed neck pain while 33% of them developed persistent neck pain[18]. Besides that, in the research study conducted, they have hypothesized those patterns of computer use and high work demands in college students are closely related to the development of neck pain[19]. However, the cause for underlying neck pain was not established.

Furthermore, it was discovered that teenagers with neck pain are at increased risk of developing pain symptoms in later part of their life. The symptoms will progressively worsen and aggravate. So, there is an increase need to search for the underlying cause for development of neck pain among college students and take preventative measures[20].

A few studies had been conducted in Malaysia to study the prevalence and possible risk factors associated with non-specific neck pain among college students. However, the results remain inconclusive. To our knowledge, our study is the first attempt to identify MTrPs as a possible cause for non-specific neck or shoulder pain among university students in Malaysia[21, 22]. Our study also aims to provide guidelines in physiotherapy sector to identify MTrPs as a possible diagnosis for those with non-specific neck or shoulder pain.

Objectives

Objectives of this research were to study the prevalence of myofascial trigger points in non-specific neck or shoulder pain among university students; to study the anatomical locations of myofascial trigger points in non-specific neck or shoulder pain among university students; to study the disability grading of non-specific neck or shoulder pain with myofascial trigger points among university students. And also to educate subjects on proper posture and self-managing techniques for myofascial trigger points.

Hypothesis: Alternate hypothesis: The higher the number of trigger points, the higher the scoring of disability grading[23, 24].

METHODS

Study Design: Cross sectional study, study setting: Universiti Tunku Abdul Rahman (UTAR) Sungai Long Campus.
Sampling Size: As per sample size calculation, 350 university students studying in UTAR, Sungai Long Campus were selected for the study.
Sampling Method: Convenient sampling was used for this study.
Study Duration: 7 weeks.

Inclusion criteria
All male and female Students enrolled into UTAR Sungai Long Campus, Any episode of non-specific neck or shoulder pain for last 1 month, At least score 2 on VAS scale of 0 – 10, Focal point of tenderness to palpation of the muscle involved were included for the study.

Exclusion criteria
Subjects with History of trauma to spine, neck and shoulder, general pathology of cervical, thoracic and shoulder, neuromuscular entrapment of cervical and shoulder, congenital and acquired spinal deformity and systemic disorders were excluded from the study.

Procedure

Study Participants: A pilot study of the screening questionnaire had been conducted with 10 students to increase the validity of the test. After making emendation of the screening questionnaire, the screening questionnaires were randomly distributed to 350 university students studying in UTAR Sungai Long Campus. All students from Faculty of Medicine and Health Sciences (FMHS) and Faculty of Accountancy and Management (FAM) were included. All participants were given 10 minutes to complete the screening questionnaire prior to collection. Any questions raised from the questionnaire were clarified by the researchers. An informed consent form was given to all the participants who participated in the survey. The screening questionnaires were used to gather the information for prevalence study and locate generally

healthy university students with MTrPs of non-specific neck and shoulder pain.

Physical Examination: Based on the screening questionnaire, eligible participants were selected according to inclusive and exclusive criteria. Selected participants were invited to Physiotherapy centre in UTAR to undergo physical examination. Appointment was made and a systematic timetable was followed. At first, Hawkins Kennedy Test was done to test for subacromial impingement while Spurling's foramen compression test was performed for cervical radiculopathy. According to a similar study conducted in Denmark, these two tests were also performed to exclude possible neuromuscular entrapments[25]. It was mentioned that Hawkins Kennedy Test showed accuracy for diagnosing different degrees of subacromial impingement syndrome[26]. In the study conducted, Spurling's Test has showed high specificity for diagnosing cervical radiculopathy. If participants showed positive sign for any one of these tests, the participants were excluded[27].

However, education and advices were also given for those who showed positive sign for these tests. Participants who showed negative sign for these tests were requested to undergo MTrPs palpation. The results were recorded in self-formulated patient assessment form. After that, another informed consent was given to participants who involved in second part of our study which MTrPs palpation. Before proceeding to MTrPs palpation, Neck Disability Index (NDI) and Shoulder Pain and Disability Index (SPADI) were given to the participants to measure their disability due to neck and shoulder related pain. Any questions or doubt raised from the index were clarified by the researchers. The marks scored in these indexes were calculated and recorded.

Examination of MTrPs: A team of three research members performed MTrP palpation over the neck and shoulder region. Palpation was done to study the anatomical location of MTrPs in specific muscles. Examiners were blinded to the screening questionnaire replies on self-reported pain area while performing MTrPs palpation. Prior to MTrPs palpation, research members were trained to locate MTrPs around neck or shoulder region using flat palpation and pincer palpation techniques. Flat palpation was done by applying finger or thumb pressure to muscle against underlying bone tissues. Pincer palpation technique was done by palpating the targeting muscle between fingers. Once the taut band was located, the examiner moved along the taut band to find a discrete area of intense pain and hardness.

A study by Sciotti VM (2001) had reported good interrater reliability for identifying taut band using palpations[28, 29]. A study had applied a standardized finger pressure by using pinch grip dynamometer. Examiners practiced a finger pressure and pinch grip of 2kg and repeat frequently between the MTrPs examinations to increase the internal validity of our study. Apart from that, anatomical locations of the MTrPs present in the specific muscles were recorded in self-formulated patient assessment form. The muscles with most number of MTrPs were identified. The areas of screening were upper trapezius, levator scapulae, neck extensors, infraspinatus, supraspinatus and middle deltoid, identified the locations of MTrPs by palpation, Figure 1.

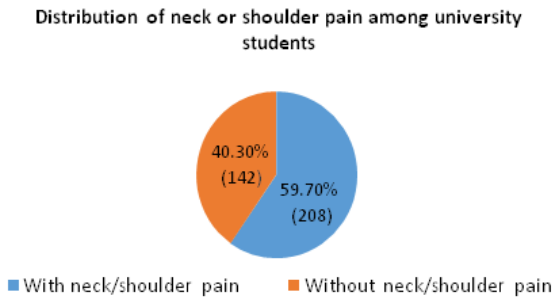
After identifying MTrPs, participants were treated using conventional treatment such as ischemic compression technique and manual stretching[30.] Ischemic compression technique was performed by applying pressure slowly and progressively over the trigger points. The tension in the trigger point and its taut band will subside with prolonged compression. The pressure was maintained for 90 seconds until the tenderness of MTrPs has released. After that, manual stretching of the specific muscles was followed. Participants were allowed to clear their enquiry throughout the process of MTrPs palpation and treatment. After that, a brochure was given to the participants to

educate participants on proper posture and self-managing techniques for non-specific neck or shoulder pain with MTrPs such as manual stretching. Participants were advised to adopt a proper posture and perform self-managing techniques regularly.

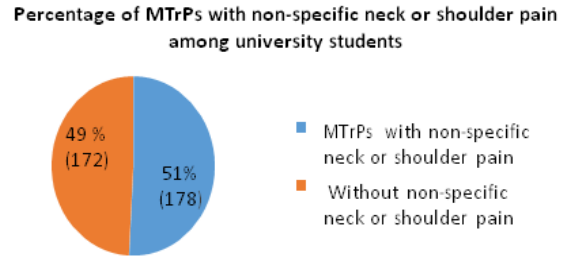
Figure 1 Palpation of 6 examined neck or shoulder locations

RESULTS

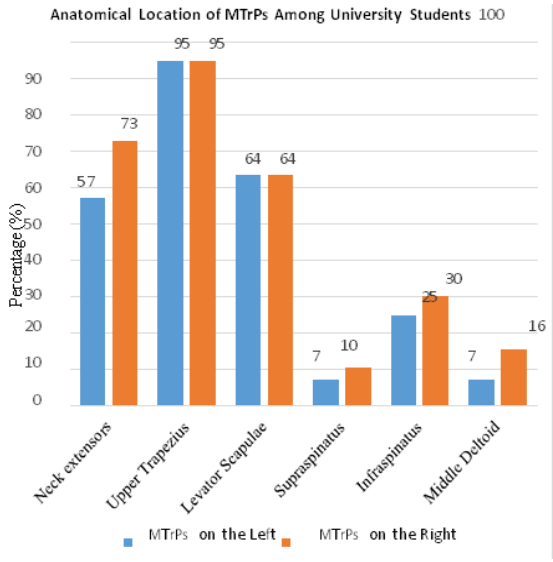
Distribution of MTrPs with non-specific neck or shoulder pain among university students are shown in Graph 1 and 2



Graph 1 shows the distribution of non-specific neck or shoulder pain among university students.



Graph 2 Prevalence of MTrPs with non-specific neck or shoulder pain among university students.



Graph 3 Anatomical locations of MTrPs and Numbers of MTrPs on the left and the right side of the body among university students.

In summary, it is mentioned that upper trapezius, levator scapulae and neck extensors were the muscles which prone to develop MTrPs while supraspinatus had less chance of developing, MTrPs Graph 3.

Numbers of MTrPs * NDI Value Cross tabulation						
			NDI Value			Total
			0-4 No Disability	5-14 Mild	15-24 Moderate	
Numbers of MTrPs	0-4 MTrPs	Numbers of Participants	12	22	3	37
		% within Numbers of MTrPs	32.4%	59.5%	8.1%	100.0%
	5-8 MTrPs	Numbers of Participants	15	33	5	53
		% within Numbers of MTrPs	28.3%	62.3%	9.4%	100.0%
	9-12 MTrPs	Numbers of Participants	1	5	0	6
		% within Numbers of MTrPs	16.7%	83.3%	0.0%	100.0%
Total		Numbers of Participants	28	60	8	96
		% within Numbers of MTrPs	29.2%	62.5%	8.3%	100.0%

Table 1 Relationship between numbers of MTrPs and NDI value.

Numbers of MTrPs * SPADI Value Cross tabulation					
			SPADI Value (%)		Total
			<= 20	>20	
Numbers of MTrPs	0-4 MTrPs	Numbers of Participants	30	7	37
		% within Numbers of MTrPs	81.1%	18.9%	100.0%
	5-8 MTrPs	Numbers of Participants	42	11	53
		% within Numbers of MTrPs	79.2%	20.8%	100.0%
	9-12 MTrPs	Numbers of Participants	4	2	6
		% within Numbers of MTrPs	66.7%	33.3%	100.0%
Total		Numbers of Participants	76	20	96
		% within Numbers of MTrPs	79.2%	20.8%	100.0%

Table 2 Relationship between numbers of MTrPs and SPADI value

Table 1 shows that most of the participants (62.5%, n=60) who had MTrPs had NDI value between 5 to 14 (mild disability). Least number of participants had NDI value between 15 to 24 (moderate disability). There were totally 37 participants who had 0-4 MTrPs. Among participants who had 0-4 MTrPs, 59.5 % (n=22) had NDI value between 5 to 14 (mild disability). Only 8.1 % (n=3) participants had NDI value between 15 to 24 (moderate disability). Whereas among 53 participants who had 5-8 MTrPs, 62.3% (n=33) had NDI value between 5 to 14 (mild disability).

Only 9.4 % (n=5) participants had NDI value between 15 to 24 (moderate disability). There were totally 6 participants who had 9-12 MTrPs. Among participants who had 9-12 MTrPs, 83.3% (n=5) of participants reported of NDI value between 5 to 14 (mild disability). 16.7 % (n=1) participants had NDI value 0-4 (no disability). No participants have NDI value between 15 to 24 (moderate disability).

Table 2 shows that that most the participants (79.2%, n=76) who had MTrPs had SPADI value ≤ 20 %. 20.8% (n=20) participants had SAPDI value more than 20%. There are totally 37 participants who had 0-4 MTrPs.

Among these participants, 81.1% (n=30) of participants had SPADI value ≤ 20 %. Among 53 participants who had 5-8 MTrPs, 79.2% (n=42) of them also had SPADI value ≤ 20 %. Same thing goes to those participants who had 9-12 MTrPs. 66.7% (n=4) of them had SPADI value ≤ 20 %. Among participants who had 0-4 MTrPs and 5-8 MTrPs, there is large difference between SPADI value of ≤ 20 % and > 20 %, which are 81.1% and 79.2 % respectively.

Whereas among participants who had 9-12 MTrPs, the percentage of SPADI value ≤ 20 % is double of > 20 %, which is 66.7 %. Therefore, we can conclude that most participants who had neck or shoulder pain had no associated disability of shoulder due to SPADI ≤ 20%.

Chi-Square Test			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.521	4	0.823
N of Valid Cases	96		

Table 3 Chi Square Test of Numbers of MTrPs and NDI value.The Chi-Square value is 1.521 with the degree of freedom 4 and there is no statistical significant association between MTrPs and grading of NDI (pvalue >0.05).

Chi-Square Test			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	0.651	2	0.722
N of Valid Cases	96		

Table 4 Chi Square Test of Numbers of MTrPs and SPADI value. The Chi-Square value is 0.651 with degree of freedom 2 and there is no statistical significant association between MTrPs and grading of SPADI (p value >0.05), as shown in Table 6.

DISCUSSION

In our study, 350 participants took part in the initial phase of this study, which was questionnaire answering. Based on the screening questionnaire, 208 participants were having neck or shoulder pain while 142 participants had no neck or shoulder pain. Among those who had neck or shoulder pain, 178 participants were having MTrPs with non-specific neck or shoulder pain. However, 72 participants did not respond to the invitation for MTrPs palpation, the second part of this research study. Only 106 participants had been

screened by examiners. This may be due to the hectic lifestyle of the students. Most of the students were busy doing assignments and preparing for midterms test. Therefore, the response rate decreased.

Out of 106 participants who had non-specific neck or shoulder pain, 10 of them were excluded due to positive results in the Hawkins Kennedy Test and Spurling's Test. Instead of having pain due to MTrPs, they might be having neck or shoulder pain due to other reasons such as subacromial impingement or cervical radiculopathy. Among 96 participants who were having MTrPs with non-specific neck or shoulder pain, 87 participants were right dominant, with only 9 participants left dominant. 25 of them were male and 71 of them were female.
From the results, it was revealed that MTrPs distribution in the right neck and shoulder muscles were 276, while in left neck and shoulder muscles, 245 numbers of MTrPs were found. However in this study, no correlation was found between hand dominance andMTrPs development.

Prevalence of MTrPs with non-specific neck or shoulder pain

The primary aim of this study was to determine the prevalence of MTrPs with non-specific neck or shoulder pain among university students. The results showed that the prevalence of MTrPs with non-specific neck or shoulder pain among university students was high, which was 51%. All 51% of the students reported to have at least one episode of neck or shoulder pain for the past one month. This finding correlates well with the findings. The former suggested that the prevalence of neck pain among university students was 41.8% while the latter observed that 46% of undergraduate students experienced neck pain for the past 1 year.

Anatomical location of MTrPs

On examination, MTrPs were found to be presented in all participants with non-specific neck or shoulder pain. In which, the muscle with most MTrPs was upper trapezius, followed by neck extensors and levator scapulae. This result is supported by the findings of Andersen (2011) and Skootsky (1989).Upper trapezius muscle is one of the three muscles that form trapezius. It originates from external occipital protuberance, medial one third of superior nuchal line, ligamentum nuchae and spinous process of C7. It is then attached to the lateral one third of the clavicle and acromion process of scapula. The upper trapezius muscle is innervated by cranial nerve XI, which is the accessory nerve[31]. The main role of upper trapezius in the body is to control the motion of head and neck as well as providing stability for the motion of scapula. Its main function is to elevate the scapula. When the insertion is fixed and upper trapezius is acting unilaterally, it extends, laterally flexes and rotates the cervical vertebrae of head and neck so that the face can turn to the opposite side. Upper trapezius also helps in extending the neck when the insertion is fixed and the muscles acts bilaterally. In addition, when the origin is fixed, it helps in the stabilization of scapula and allows adduction to take place.

Many researches have been conducted to study the load on upper trapezius in different working posture. A study proposed that continuous and repetitive use of mouse will result in higher activity level of upper trapezius, indicating a possible increase in risk for developing musculoskeletal symptoms[32].

Based on the results in this study, the prevalence for MTrPs in upper trapezius is 95% in both left and right side. This finding suggests similarities with the study done, in which the author reported that MTrPs in the upper trapezius muscle were found in 76% on the right and 56% on the left[33]. It was hypothesized that static postural and visual stress experienced during computer work might contribute to MTrPs development in the trapezius muscles, resulting in myofascial pain[34] .Levator scapulae are a neck muscle that originates from the transverse process of first 4 cervical vertebrae, and connects to the medial border of scapula. It is mainly used to elevate the scapula as well as to flex,

extend and rotate the cervical spine. The neck extensor muscles, chiefly semispinalis and splenius muscles connect the back of the neck to the head for motions to take place.

Posterior neck extensors consist of several muscles such as rectus capitis posterior minor, rectus capitis posterior major and oblique capitis superior. Rectus capitis posterior minor originates from tubercle on posterior arch of atlas and inserts at the medial part of inferior nuchal line of occipital bone. Rectus capitis posterior major originates from spinous process of axis and attaches to lateral part of inferior nuchal line of occipital bone. Apart from that, oblique capitis superior originates from superior surface of transverse process of atlas and inserts between superior and inferior nuchal lines of occipital bone. Posterior neck extensors act bilaterally to extend the neck[31], Figure 2.

When both levator scapulae and neck extensors act as a unit, they will provide stability as well as prevent forward flexion and rotation of the neck during static working positions[30]. Throughout this study, underlying causes for non-specific neck or shoulder pain was not studied but study suggested that long hours of static posture and computer usage may contribute to these symptoms[10].

This study also revealed that the prevalence of MTrPs is equally high in both levator scapulae (64% in both left and right) and neck extensor muscles (left: 57%, right: 73%). This results show similarities with the study conducted, which showed that there was a high prevalence of MTrPs among levator scapulae and neck extensors[25].

In addition, a study observed that higher levels of static activity is found in the neck and shoulder muscles when the whole spine is flexed in sitting position compare to sitting with straight and vertical spine; a flexed spine causes shortening of the neck extensors muscle[35]. When the spine is flexed for a long period of time, it increases the risk of developing MTrPs at the neck region.

Pain

Characteristic of pain experienced by participants who had non-specific neck or shoulder pain were also observed. From the results collected from the screening questionnaire, it was mentioned that most of the participants experienced intermittent pain. Out of 208 participants, 174 participants complained having intermittent pain whereas 34 participants described their pain to be constant throughout the day. Apart from the findings stated above, most participants reported of no change in pain throughout the day. However, 6 participants complained their pain to peak during mornings, 10 participants had pain that peak in the evenings and 16 to peak at night. It was also discovered that among 208 participants who experienced non-specific neck or shoulder pain, 22 of them were having referral pain to other areas other than from the main complaints. The pain spread to several areas such as head, neck, left shoulder, right shoulder, left arm, right arm, upper back and low back. 21% of referral pains were located at left and right shoulder while 16 % of referral pains were located at neck and lower back. Besides that, 11% of referral pains were located at left arm and right arm, followed by 3 % at head and upper back.

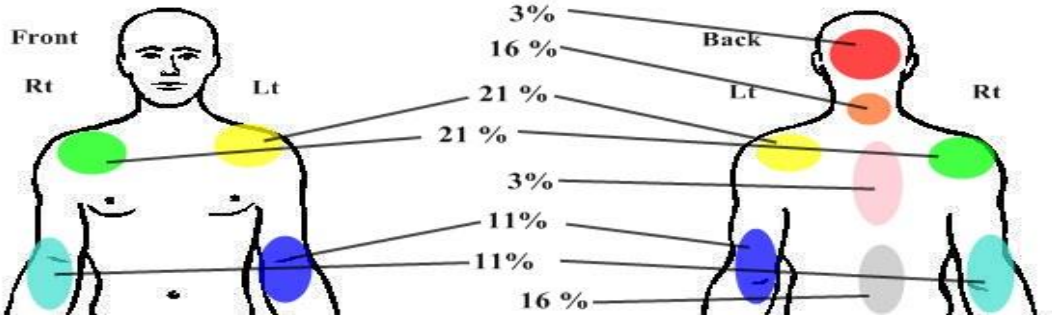


Figure 2 Distribution of referral pain pattern

Compared to a similar study conducted, this study shows smaller target population and sample size. A study used a sample size of 1035 subjects while only 350 subjects were involved in this study. Although sophisticated methods for research study in the area of MTrPs exists, manual palpation methods had been used in both studies.

In the study conducted, comparison of the tenderness score obtained in eight anatomical locations had been carried out between men and women[25]. It was mentioned that levator scapulae and neck extensors have shown highest tenderness score among women, and levator scapulae has shown the highest score in men. While in this study, upper trapezius, followed by levator scapulae and neck extensors demonstrated highest susceptibility for MTrPs development among the six muscles. No gender comparison has been done in this study. However, disability caused by both non - specific neck and shoulder pain was investigated in this study.

To sum up, the prevalence of MTrPs with non-specific neck or shoulder pain was 51%. Upper trapezius, levator scapulae and neck extensors were among the muscles that were most likely to develop MTrPs. However, no statistical significance was showed in both the results of disability grading for both non-specific neck and shoulder pain.

Disability Grading

Neck Disability Index (NDI)

One of the study objectives is to study the disability grading of non-specific neck or shoulder pain with MTrPs among university students. The results showed that there is no statistically association between numbers of MTrPs with NDI. However, most participants showed high NDI value of 5 to 14, which can be categorized under the group of mild disability. This finding is in accord with a previous study conducted in 1999 , showing that neck pain is mostly mild, typically not life threatening[3] and does not result in high disability[5].

Shoulder Pain and Disability Index (SPADI)

Apart from NDI, SPADI was also used to study the disability grading caused by MTrPs with non-specific neck or shoulder pain among university students. The results showed that there was no statistically significant association between numbers of MTrPs with SPADI. However, most participants showed SPADI value less than 20 %. This result shows similarities with the work done by[24], suggesting that no association was found between MTrPs with non-specific neck or shoulder pain and disability.

In this study, results showing association between non-specific neck or shoulder pain with disability grading was not obtained. This is because the target population was not large enough to cover the whole population of university students. As a result, the selected sample size was too small to display significant results. Sample size is used to maximize statistical significance. Larger samples increase the chance of significance because they reliably reflect the population mean. As in this study, small sample size resulted in small numbers of subjects in each category. Therefore, the results were not statistically significant.

CONCLUSION

In conclusion, our study found out that there is a high prevalence of MTrPs development over several muscles of neck or shoulder region among university students with non-specific neck or shoulder pain, with upper trapezius being the most evident muscle, followed by levator scapulae and neck extensors. Besides that, no statistically significant association has been found between number of MTrPs and disability grading. However, majority of the participants (62.5%) with non-specific neck and shoulder pain fall under the category of mild disability. This study also revealed no statistical significant association between neck or shoulder pain with the time spent in lecture, study, computer and mobile phone use. We recommend future studies to take up larger sample size to draw a correlation between these symptoms and possible risk

factors. Large sample size can also be included to focus on male and female population separately. Additional research can focus on basic and modification of ergonomics to carry out daily activities. Environmental modifications and preventive measures can also be made part of study.

Last but not least, our study suggests that there is a need to identify MTrPs as a possible diagnosis for those with non-specific neck or shoulder pain. Although this is just a preliminary research, as the associations were observed, together with the increasing use of mobile phones and computer, this urges the need for more research in this field to be conducted, at the same time including an interventional study for treating MTrPs.

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