

Prevalence of degree of severity of temporomandibular joint disorder based on sex and age group

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ABSTRACT

Temporomandibular joint disorders are disturbances of mastication system due to one or more component of mastication system does not properly function. The factors that play a role to this problem divided into three factors; a) predisposition factor (systemic, occlusion disturbances and psychological trouble), b) initiation factor (traumatic) and c) perpetuation factor (social behavior). These disorder are able to cause variety of symptom such as limitedness of jaw movement, clicking, deviation locked joint, muscle pain, joint pain, jaw movement pain and pain of ear and headache. The objective of this study was to obtain information about the prevalence degree of severity of temporomandibular joint disorder, the differences of prevalence between man and woman and the different among age groups. The study was descriptive and analysis survey, done to 134 patients as experimental sample of 3-75 year old that have visited to Dental Hospital, Padjadjaran University Bandung, during February 2008. Sample consist of 57 men and 77 women were evaluated by using Helkimo Index and analysis by using Z statistical proportion test to know the existence of difference prevalence degree of severity between man and woman and using chi-square test to know the difference prevalence among age groups. The result of this study show that there is highly prevalence severity of temporomandibular joint disorder (84,33%) and significantly different on prevalence severity between man and woman and among group of ages. Conclusion can be drawn that patients who visited to dental hospital, Padjadjaran University have higher prevalence severity of temporomandibular joint disorder where woman has higher level compare to man, and young adult group has highest either man and woman. Clicking is the most often symptom appear to man and woman.

Key words: Helkimo Index, Prevalence, Temporomandibular Joint Disorders

INTRODUCTION

Mastication system is a functional unit for chewing, swallowing, and speaking. This system consists of three main components: dentition and the supporting tissues, mandible-moving muscle and the nerve system, and temporomandibular joint system. In order to establish a normal and

stable function, the three components should be in healthy condition, work normally, and perform a synchronous, balance and harmonic interaction.¹⁻³

Temporomandibular joint is a component of mastication system formed by temporal bone glenoid fossa and mandibular condylar process. Both left and right joint is connected to mandible by ligaments and muscles that produce bilateral

articulation between one part of mandible and cranium.³

Temporomandibular joint disorder is a mastication system disorder that involves mastication muscles, temporomandibular joint and surrounding tissue structures. This disorder is the main cause of non-dental pain in the orofacial area and many other symptoms.⁴

The common symptom is pain localized in mastication muscles, pre-auricular area, and temporomandibular joint. It is worsen when chewing or performing the jaw function. Other symptoms that frequently appear are limited jaw movement, asymmetric mandible movement, and joint sound. Symptoms that are often related to bruxism and clenching are the presence of mastication muscles hypertrophy and abnormal occlusal wear.⁴

The cause of this disorder is complex and multifactor that can be classified into three major groups: predisposition, initiation, and perpetuation factor. The predisposition (tendency) includes general health, psychology, and the occlusal and joint structural condition. The initiation factor (initial) includes trauma and overload (parafunction). The perpetuation factor (adjusting) includes social environment, emotional problems, and several stress type and health problems.^{3,5-7}

This temporomandibular joint disorder is frequently seen in community. The experiment that is established by Mardjono² in 498 sample of 20-25 years old in Jakarta showed 79.3% of adult have joint disorder. Whereas Helkimo established a research to 321 Finland of 15-75 years old that showed 88% of the sample have joint disorder with one or more symptoms.⁸⁻⁹

Research about the prevalence of temporomandibular joint disorder severity level has been performed by several researchers and the results were vary according to the index, anesthetic dysfunction or clinical dysfunction index.^{9,10} Considering the gender distribution, many researchers stated that the majority (70-90%) of joint disorder was founded in women⁸, but other experiments stated that there was no significant different in joint disorder case between man and woman.^{2,9,10}

There is also exist different result between each age group in the distribution, just like in

Mardjono experiment.² The experiment stated that age group of 41-55 years old experience the most frequent joint disorder. Whereas Koidis founded that the biggest group is group of <30 years old.¹¹

Therefore, due to the fact that the differences and the experiment performed in Indonesia only underlined the cause, symptom and treatment, but not the temporomandibular joint disorder severity level prevalence in all age groups, the author would like to observe the temporomandibular joint disorder severity level prevalence based on gender and age group among Oral and Dental Hospital Faculty of Dentistry Universitas Padjadjaran Bandung/RSGM FKG UNPAD patients.

METHODS

The research was performed using descriptive and analytical survey approach. The data were collected by using questionnaires, as well as clinical examination of the subjects. The data collected were then assessed by Helkimo's clinical dysfunction index^{8,9}, then the analysis of prevalence level of temporomandibular joint dysfunction were performed based on sex and age.

Population in this research is all of the patients who visit Oral and Dental Hospital Faculty of Dentistry Universitas Padjadjaran Bandung/RSGM FKG UNPAD in February 2008 and meet the criteria: (1) They did not have unstable teeth, dental gap, bleeding gum, trigeminal neuralgia, pericoronitis, pulpitis, ear inflammation, sinus or nose inflammation, sore throat and rheumatic which the symptoms like temporomandibular disorder symptoms.¹² (2) They were not taking any painkiller or analgesics.

Samples were taken by random sampling method from the populations. Instruments and material for the research are: dental chair, mirror, tweezers, explorer, masker and gloves, stethoscope, ruler, stationery, questionnaire sheet (personal data and medical history), clinical examination sheet.

The steps of the research

Patients who visit Oral and Dental Hospital Faculty of Dentistry Universitas Padjadjaran Bandung/RSGM FKG UNPAD were first examined in

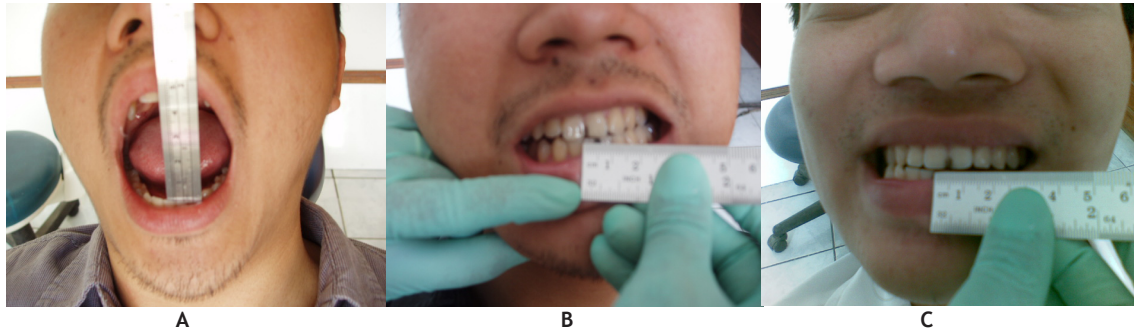


Figure 1. The examination of movement restriction: A. Vertical; B. Left horizontal; C. Right horizontal.



Figure 2. The examination of joint noise (clicking).

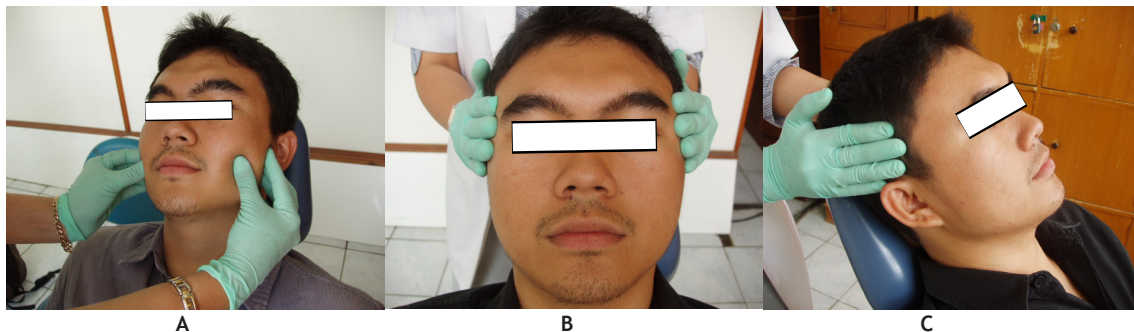


Figure 3. Muscle examination: A. Masseter; B. Temporal regio anterior; C. Temporal regio posterior.



Figure 4. Muscle examination: A. Inferior lateral pterygoid; B. Superior lateral pterygoid and medial pterygoid

* The arrow indicates jaw movement.

the screening department to have thorough dental examination, then they were given a questionnaire sheet asking about their personal data and medical history.

Questionnaires which have been filled by

the patients were then assessed by the research. If the result meet the criteria of research subject, the patient were asked to fill letter of approval to be research subject. Patients then were asked to sit in dental unit, then they were examined



Figure 5. Muscle examination: A. Trapesius; B. Splenius.



Figure 6. Muscle examination: A. Sternocleidomastoid; B. Servicalis.



Figure 7. Joint examination: A. Lateral palpation; B. Posterior palpation.

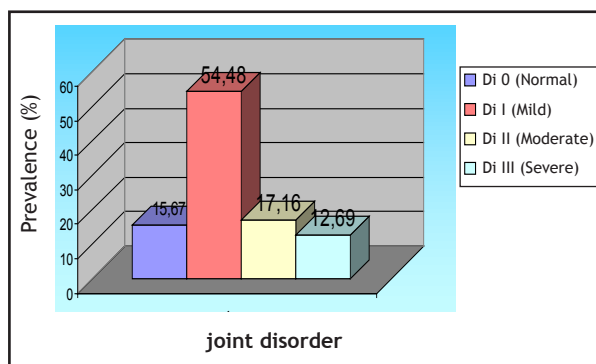


Figure 8. Temporomandibular joint disorder severity level prevalence (Normal, mild, moderate, and severe).

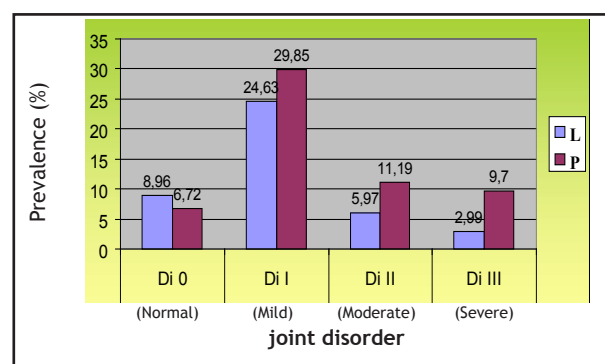


Figure 9. Temporomandibular joint disorder severity level based on gender (Normal, mild, moderate, and severe).

to find if they have the five clinical symptoms of temporomandibular joint disorder.^{8,9}

The examination of jaw movement was

performed to find out whether there is jaw movement restriction. The examination included the measurement of the range of vertical and

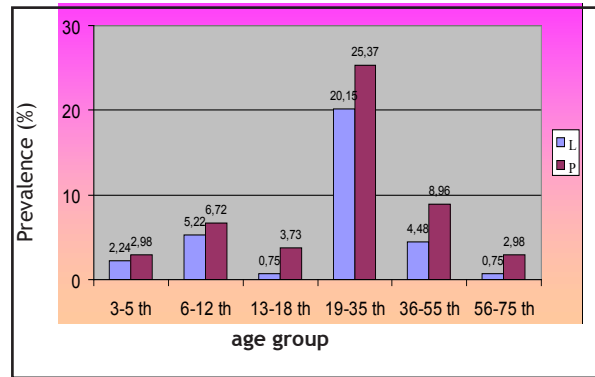


Figure 9. Temporomandibular joint disorder severity level based on age group (Normal, mild, moderate, and severe).

Table 1. Temporomandibular joint disorder severity level analysis based on gender.

	N	Normal	Disorder	Prevalence	Z-count	Z-table	Properties
Men	57	12	45	33.58209	2.70	1.96	Sign
Women	77	9	68	50.74627			
Total	134	21	113				

Table 2. Analysis of joint disorder severity level based on age group.

Age group	Observed N	Expected N	Residual
Play group (3-5)	7	18.8	-11.8
Elementary School (6-12)	16	18.8	-2.8
Teen (13-18)	6	18.8	-12.8
Adolescence (19-35)	61	18.8	42.2
Edult (36-55)	18	18.8	-8
Elderly 56-75	5	18.8	-13.8
Total	113		

horizontal mouth opening. To examine vertical range, patients were instructed to open their mouth as wide as possible, then the distance between incisal edge of maxillary and mandible central incisor were measured. The results were then recorded in clinical examination sheet (Fig 1 A).¹³

To examine left horizontal jaw movement, the patients were instructed to move their jaws as wide as they can to the left, then it was measured by drawing a line in upper central incisor diameter, to the diameter of lower central incisor (Fig.1 B), and the contrary were performed to examine right horizontal jaw movement (Fig 1 C).¹³ The results were then recorded in clinical examination sheet.

The examination of joint function were performed to find out whether there are noise in the joints, deviation, and locked joint. The examination were performed by instructing the

patients to open and close their mouth, with stethoscope that were put in the joint area, then the operator listened to the noise of the joint (Fig. 2).¹³ The results were then recorded in clinical examination sheet.

The examination of deviation was performed by instructing the patients to open and close the mouth. Then the operator observed the pattern of mouth opening, as well as observed the direction of deviation whether it was to the right or left.¹³ Besides, operator also observed whether the patients suffered joint lock in mouth opening. The results were then recorded in clinical examination sheet.

The examination of the muscles was performed to see if there were muscle pains. The examination included masseter, temporal, pterygoid lateral superior, pterygoid lateral

Table 3. Prevalence of temporomandibular joint disorder symptom severity level on man.

Symptoms	Age group						Total	%
	3-5	6-12	13-18	19-35	36-55	56-75		
Limited jaw movement includes:								
Limited vertical movement	3	4	-	3	1	-	11	6,63
Limited horizontal movement	2	1	1	17	2	-	23	13,85
								20,48
Limited joint function includes:								
Clicking	-	2	-	16	4	1	23	13,85
Deviation	-	1	-	12	4	-	17	10,24
Locking jaw	-	-	-	1	-	-	1	0,60
								24,69
Muscle pain includes:								
Masseter muscle pain	-	-	-	11	2	-	13	7,83
Temporal muscle pain	-	-	-	6	3	-	9	5,42
Pterygoid Lateral muscle pain	-	-	-	4	2	-	6	3,61
Pterygoid Medial muscle pain	-	-	-	5	-	-	8	4,82
Trapezius muscle pain	-	-	-	16	5	1	22	13,25
Splenius muscle pain	-	-	-	3	4	1	8	4,82
Sternocleidomastoid muscle pain	-	-	-	3	-	-	3	1,81
Cervical muscle pain	-	-	-	9	3	-	12	7,23
								48,79
Temporomandibular joint pain include:								
Lateral Palpation pain	-	-	-	1	-	-	1	0,60
Posterior Palpation pain	-	1	-	1	2	-	4	2,41
								3,01
Jaws movement pain includes:								
Vertical movement pain	-	-	-	2	1	-	3	1,81
Horizontal movement pain	-	-	-	1	1	-	2	1,20
Chewing movement pain	-	-	-	-	-	-	0	0,00
Swallowing movement pain	-	-	-	-	-	-	0	0,00
								3,01
Total	5	9	1	111	37	3	166	100,00
%	3	5,42	0,60	66,87	22,29	1,81	100,00	-

inferior, pterygoid medial, trapezius, splenius, sternocleidomastoid and servical muscles examination. The examination of masseter muscle were performed by directly palpating the masseter muscles (Fig. 3 A).¹³ Patient's response were then recorded in the clinical examination sheet.

Temporal muscle examination were performed by directly palpating the regio anterior and posterior of temporal muscle (Fig. 3 B,C). The examination of lateral and medial pterygoid muscle was performed by functional manipulation. Functional manipulation of inferior lateral pterygoid muscle were performed by asking the patients to make protrusive movement against resistance movement (Fig 4. A),¹³ meanwhile

functional manipulation of superior lateral pterygoid muscle and medial pterygoid muscle were performed by asking the patients to clench or to bite the separator strongly (Fig. 4 B,C).¹³ If this muscles is the source of pain, the movement will cause the pain.

The examination of trapezius muscle was performed by palpating from the backside of sternocleidomastoid muscle, aside and down to the shoulder (Fig. 5 A). Splenius muscle examination were performed by palpating the splenius muscle attachment in the cranium, i.e. posterior area of sternocleidomastoid muscle (Fig 5 B).¹³

The examination of sternocleidomastoid muscle and servical muscle were performed by

Table 4. Temporomandibular joint severity level prevalence in women.

SYMPTOMS	AGE GROUP						Total	%
	3-5	6-12	13-18	19-35	36-55	56-75		
Limited jaw movement includes:								
Limited vertical movement	2	6	1	6	1	-	16	4,66
Limited horizontal movement	2	5	2	13	7	1	30	8,75
								13,41
Limited joint function includes:								
Clicking	1	2	3	29	11	3	49	14,29
Deviation	-	2	3	22	6	2	35	10,20
Locking jaw	-	-	-	-	-	-	-	0,00
								24,49
Muscle pain includes:								
Masseter muscle pain	-	-	1	17	5	-	23	6,71
Temporalis muscle pain	-	-	2	12	6	-	20	5,83
Pterygoid Lateral muscle pain	-	-	1	8	2	-	11	3,21
Pterygoid Medial muscle pain	-	1	2	11	5	-	19	5,54
Traphesius muscle pain	-	1	3	30	12	3	49	14,29
Splenius muscle pain	-	-	-	8	2	-	10	2,92
Sternocleidomastoid muscle pain	-	-	1	7	7	2	17	4,96
Cervical muscle pain	-	-	3	19	8	2	32	9,33
								52,79
Temporomandibular joint pain include:								
Lateral Palpation pain	-	-	-	8	1	-	9	2,62
Posterior Palpation pain	-	-	2	11	1	-	14	4,08
								6,70
Jaws movement pain includes:								
Vertical movement pain	-	-	-	5	-	-	5	1,46
Horizontal movement pain	-	-	-	1	1	-	2	0,58
Chewing movement pain	-	-	-	2	-	-	2	0,58
Swallowing movement pain	-	-	-	-	-	-	-	0,00
								2,62
Total	5	17	24	209	75	13	343	100,00
%	1,46	4,96	7,00	60,93	21,87	3,79	100,00	-

palpating the muscles, as shown in Figure 6A and B.¹³

Temporomandibular joint examination is performed to examine the present of joint pain include condyle lateral aspect palpation that located 10 mm in front external acusticus meatus (Fig. 7A) and condyle posterior aspect palpation by pressing pointy finger on meatus acusticus externus and palpated anteriorly (Fig. 7 B). Palpation is performed when the mandible not able to move dynamically and when the finger positioned on joint area, ask the patient to relax and give moderate pressure on the joint area, and examine the patient facial expression, then ask about any symptom that he/she felt and write it down in the examination sheet.

Jaw-movement examination is performed to examine the present of pain during movement by instructing the patient to open and close his/her mouth, moving the jaw to the left and right, chewing, and swallowing. Then record the response in the clinical examination sheet. After examined and the result recorded, the patient is asked to continue the treatment needed.

RESULT

To find out the severity level prevalence of temporomandibular joint disorder based on gender and age, a study is performed to patient of Oral and dental Hospital FKG UNPAD on February 2008.

The sample consists of 134 individuals include 57 men (42.55%) and 77 women (57.46%). From the initial study performed in one week, patient who come and fills the criteria is 177 individuals. So in the February, it is assumed that the population is fourfold, that is 708 individuals.

Figure 8. presents the result of temporomandibular joint disorder severity level prevalence descriptively. Of the entire sample, 15.67% experience no disorder, and 84.33% experience the disorder from mild to severe, i.e. 73 patients (54.84%) have mild disorder, 23 patients (17.16%) have moderate disorder and 12.69% have severe disorder.

Result about temporomandibular joint disorder severity level prevalence based on gender is descriptively presented in Fig 9. According to the research, women show higher prevalence than men, i.e. 29.85% have mild disorder, 11.19 have moderate disorder, and 9.70 % have severe disorder and group that experience no disorder is lower, that is 6.72%.

Table 1 above shows that there are statistically significant differences between men and women It means that men prevalence of 33.58% is significantly different from women prevalence of 50.57%. This shows that frequency of temporomandibular joint disorder in women is higher than men.

The research result about the prevalence of temporomandibular joint disorder severity level based on group age is descriptively seen in the Fig 10, where the age group of 56-57 years old has the lowest prevalence (3.73%) and age group of 19-35 years old (adolescence) has the highest prevalence either in men (20.15%) or women, (23.37%).

Table 2 above shows that there is a statistically significant different in the age group, And it is shown that the residual value in the adolescence group (19-35 years old) is 42.2. The value is the highest in the age group category, so it can be concluded that the adolescence is the group with the highest prevalence of temporomandibular joint disorder.

The research result about prevalence of temporomandibular joint disorder severity level is descriptively shown in the Table 3. The table above shows three most often symptoms in men, i.e. clicking (13.85%), limited horizontal movement (13.85%), and trapezius muscle pain (13.25%), and

chewing and swallowing pain.

In women, the prevalence of temporomandibular joint disorder symptom is descriptively shown in the Table 4 where there are three most often symptoms, i.e. clicking (14.29%), trapezius muscle pain (14.29%), and deviation (10.20%). Locking and swallowing pain are not founded in the research. From the Table 2 and 3, the most symptoms is happened in the age group of 19-35 years old (adolescence), either in men (66.87%) or women (60.93%).

DISCUSSION

It is shown in the Fig 8. that from overall sample, only 15.67% patients who do not experience the disorder, whereas the others 84.33 patients experience the disorder of mild-severe level. If compared with other prior experiments, such as Helkimo^{8,9} or Otuyemi¹⁰, there no significant different in the severity level percentage, Helkimo has 8% samples with clinical disorder and Otuyemi has 62.8% samples with the highest percentage on mild disorder and the lowest percentage in the severe disorder. From theses results, it can be concluded that the temporomandibular joint disorder case has a high prevalence number, where nationality does not affect possibility of the appearance.

Severity level prevalence based on gender shows that there is a statistically significant different between men and women as shown in the Fig 9, i.e. the severity level prevalence in women is 50.75% and in men is 33.58%. The result meets with many other prior researchers, such as Agerberg¹⁴, Butler¹⁵, Takada¹⁶, Koidis¹¹ and Lunden¹⁷. They founded that women has higher prevalence of temporomandibular joint disorder case than men.

This is caused by the different of physiology and psychology factors between men and women. Concerning physiology, women has better tolerant and pain threshold than men.¹¹ The psychology factor is very important, because feelings of worried, depression, anger, and emotion are common in women and can result in muscle tension¹⁷, constriction, and oxygen reduction in the blood vessel and substance releasing that can produce pain.¹¹ And it is also said that women frequently seek out treatment for joint

disorder.^{2,17}

In this experiment, the severity level prevalence based on age group shows that there is a significant different between each groups, where the adolescence (19-35 years old) has the highest prevalence, either in men (20.1%) or in women (25.37%). The result is similar to Otuyemi¹⁰ experiment on 308 adolescence samples of 17-32 years old in Nigeria with 62.5% of temporomandibular joint disorder case. The high percentage is also founded in Mardjono² experiment on sample of 41-45 years old with 93.6% of temporomandibular joint disorder case and Koidis experiment on sample of <30 years old with 64.5% of temporomandibular joint disorder case.¹¹

This is resulted because in adolescence group, the stress increasing and psychological problem related to economical condition is very common.¹⁷ And more often as a result of tooth removal that is not followed by immediately replacement. This could gives rise to tooth position change that located close to diastema, so the tooth become extruded and inclined and every time the mandible move, it collide with the opposite tooth.² These collisions could result in microtrauma in temporomandibular joint, where unnecessary force produced every time the teeth contacts each other, such as drawer, rotation, or torque on temporomandibular joint. If this happens continuously, then it will eventually produce temporomandibular joint disorder.¹²

The temporomandibular joint disorder symptom based on gender can be seen in Table 2 and 3. According to the tables, clicking or sound of joint is a common symptom for the joint disorder patient, either in men (13.85%) or women (14.29%). The experiment performed by Agerberg and Carlsoon⁸ on 1,215 women samples of 15-74 years old and Hasson and Nilner on 1.069 patient of 2–65 years old show similar results for clicking, i.e. 39% and 65%.¹⁸

Clicking or joint sound is resulted from condylus and disc in-coordination where disc (disc displacement) moves interiorly, so when the condylus crossing the disc thick-area, clicking is produced.¹² Clicking can be heard by put the stethoscope (auscultation) on the joint area, where condylus suddenly slip/hop.² The clicking is an initial symptom of temporomandibular

joint disorder before severe symptoms appear.¹⁹ This is the reason why clicking is the most common symptom in this experiment and other experiments.

Trapezius muscle pain is the second common symptom in women (14.29%) and the third in men (13.25%). According to Mc Neill, pain in the neck and shoulder muscles (include trapezius muscle) is estimated about 40% of all chronic joint function disorder case. The muscles in neck and shoulder are not the main muscle in the mandible movement¹², but have important role in the mandible function because there is a connection between this muscle pain and patient work load or body position.²⁰ In this experiment, there was a sample who work as star observer, work in building store so he has to carry cement on his back, dentist, and secretary who has to utilize a computer continuously. And there was also patient with head position more forward than his back, so resulted in trauma/workload to his trapezius muscle. As said before, inappropriate body position or continuously trauma on one of body organ, especially muscles around head, neck, and shoulder can result in muscle fascia function disorder that causes other organ disorder such as joint.²⁰

Even tough there are differences of sample amount, the age group distribution and measuring method, but the result achieved is quite similar to the prior experiments. Such as Clark²¹, Helkimo²² clinical dysfunction index has many deficiency, i.e. not mention how big the force given to the muscle or joint, not using clicking/joint sound severity assessment method, not grouping the disorders according to the cause and very depends on the researcher competence and the patient honesty in answering the question. Song also stated that Helkimo clinical dysfunction index can not differentiate the disorder of joint, muscle or both and not sufficiently sensitive to measure any little change in every severity level.²²

Because this experiment is still lack of system index, it is needed to perform experiment using index system that can improve the Helkimo index system, such as RDS (Research Diagnostic Criteria) index system. RDC can differentiate the disorder according to the cause, so the result achieved can be accurately apply for more appropriate treatment plan.

CONCLUSION

Oral and Dental Hospital Faculty of UNPAD patients have high prevalence number of temporomandibular joint disorder severity level, that is 84.33%, where the bigger percentage of 54.48% experience mild disorder. The prevalence of temporomandibular joint disorder severity level based on gender shows that women significantly has higher prevalence than men and the prevalence based on age group shows that adolescence group significantly has highest prevalence, either in women or men. The temporomandibular joint disorder symptom prevalence shows three most common symptoms in men, that are clicking, limited horizontal movement, trapezius pain, and three most common symptoms in women that are clicking, trapezius pain, and deviation.

SUGGESTION

Considering the high prevalence of temporomandibular joint disorder severity level, it is needed to give extra attention to the preventive action toward the disorder, causes and symptoms, especially on the gender and groups who has highest prevalence. It is suggested to provide facilitations needed by the patients, such as physiotherapy tools, medication, and material and tools to make an occlusal splin so the patient can be treated immediately and directly. And it is necessary to perform an experiment about temporomandibular joint disorder using other index that can differentiates the disorder according to the cause, so a direct-diagnostic result can be achieved and the treatment can be established appropriately.

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