RELATIONSHIP OF ONE SIDE CHEWING HABITS TO TEMPOROMANDIBULAR JOINT DISORDERS OCCURRENCE

(HUBUNGAN KEBIASAAN MENGUNYAH SATU SISI TERHADAP TERJADINYA GANGGUAN SENDI TEMPOROMANDIBULA)

Rheni Safira Isnaeni[1*], Azkya Patria[1], Intan Renita Silvana[1]

[1]Department of Prosthodontics, Faculty of Dentistry, Universitas Jenderal Achmad Yani, Cimahi Indonesia

*Corresponding author

rheni.safira@lecture.unjani.ac.id

JHDS.unjani.ac.id/jite
Doi: 10.54052/jhds.

Article History
Received:03/07/2022
Accepted: 08/08/2022

ABSTRACT

The temporomandibular joint is called temporomandibular disorder (TMD) and it can be characterized by pain, limited mouth opening, masticatory disorders, joint sounds (clicking or tapping sound), crepitus, tinnitus, and persistent headache. The causes of temporomandibular joint disorders are multifactorial. The most common occurrences of these disorders are tooth loss, bad habits are bruxism, chewing on one side, and leaning on the chin. This study aimed to determine the relationship between one-sided chewing habits and the incidence of temporomandibular joint disorders in students of the Faculty of Medicine and Faculty of Dentistry, batch 2020. This research was an analytic study with a cross-sectional approach. The data were analyzed using the chi-square test with 245 research subjects from the Faculty of Medicine and the Faculty of Dentistry, batch 2020. This study used a questionnaire in the form of a g-form which was adapted from the

AAOP questionnaire and distributed to all students of Jenderal Achmad Yani University Batch 2020. The results of this study found that 168 students (88.89%) have the habit of chewing on one side and the symptoms of temporomandibular joint disorders with a value of p = 0.021. It can be concluded that in this study, there is a relationship between one-sided chewing habits and symptoms of temporomandibular joint disorders

Keywords: chewing; temporomandibular disorders

ABSTRAK

Sendi temporomandibula dapat mengalami suatu gangguan yang disebut dengan temporomandibular disorder (TMD). Gejala gangguan sendi temporomandibula tersebut dapat ditandai berupa rasa sakit, keterbatasan membuka mulut, gangguan pengunyahan, bunyi sendi (bunyi klik atau keletuk sendi), krepitasi, tinitus dan nyeri kepala yang berlangsung lama. Penyebab gangguan sendi temporomandibula multifaktorial, kejadian terbanyak gangguan tersebut yaitu kehilangan gigi, kebiasaan buruk yaitu bruxism, mengunyah satu sisi dan bertopang dagu. Tujuan dari penelitian ini adalah untuk mengetahui hubungan kebiasaan mengunyah satu sisi terhadap kejadian gangguan sendi temporomandibula pada mahasiswa Fakultas Kedokteran dan Fakultas Kedokteran Gigi Angkatan 2020. Jenis penelitian ini adalah studi analitik dengan pendekatan cross sectional. Data dianalisis menggunakan uji chi square dengan subjek penelitian sebanyak 245 mahasiswa Fakultas Kedokteran dan Fakultas Kedokteran Gigi Angkatan 2020. Penelitian ini menggunakan kuesioner berupa g-form yang diadaptasi dari kuesioner AAOP dan disebarkan kepada seluruh mahasiswa Universitas Jenderal Achmad Yani Angkatan 2020. Hasil penelitian ini didapatkan 168 mahasiswa (88,89%) yang mempunyai kebiasaan mengunyah satu sisi dan adanya gejala gangguan sendi temporomandibula dengan nilai p=0,021 < 0,05. Dapat disimpulkan bahwa dalam penelitian ini terdapat hubungan antara kebiasaan

mengunyah satu sisi terhadap gejala gangguan sendi temporomandibula.

***Kata kunci**: gangguan sendi temporomandibular; mengunyah*

INTRODUCTION

The temporomandibular joint disorder, or temporomandibular disorder (TMD), is characterized by impaired muscle and joint function disorders in the form of pain and limited mouth opening, masticatory disorders, joint sounds, crepitus, pain in the area around the ears, tinnitus and the head that lasts for a long time.[1–4] The percentage of the population suffering from temporomandibular joint disorders covers 76% of the total population and continues to increase every year.[5,6] Based on epidemiological studies conducted in various countries, about 5-60% of the adult population has one of the signs of temporomandibular joint disorders.[6] This is reinforced by research conducted in Brazil and the United States, which showed a person is experiencing temporomandibular joint disorders as much as 68% and 50% accompanied by deviation of the jaw opening.[7,8] Research conducted in China and Japan also found that the prevalence of signs and symptoms of temporomandibular joint disorders was 75.8% and 74%, respectively.[8,9] The incidence of temporomandibular joint disorders in Indonesia is quite high, reaching 79.3% of the entire population, and according to research conducted by Carolina et al stated that it is more common in the adolescent population (13-18 years).[3,8,10] Temporomandibular disorders generally occurring at all ages, but more often occurs at the age of 20-45 years and occurs more in women than men with a ratio of 5:1 or around 40-60.[3,5,7,11] Age groups, gender, population, sample size and different examination methods can play a role in obtaining different results. Temporomandibular joint disorders that last a long time and the cause is not treated will affect the function and performance of mastication so that it has an impact on the patient's quality of life.[3,12]

The etiology of temporomandibular joint disorders is multifactorial, consisting of anatomical factors. It is the relationship between skeletal and occlusion, trauma, emotional stress, genetics, parafunctional habits, etc.[3,13] The most common causes of this disorder are tooth loss, bad habits, namely bruxism, chewing on one side, and supporting the chin.[14]

Chewing on both sides of the jaw or mastication is an ideal process that can balance the masticatory and muscle functions. Muscles and joints alternate between periods of active and resting. One-sided mastication causes unbalanced stimulation of dentofacial growth and structures of the stomatognathic system. If it lasts for a long time, excessive pressure on the temporomandibular joint can cause the joints and muscles to undergo adaptive and degenerative changes and cause wear and tear on the articular eminence area, which can cause pain.[3,11,15,16] Individuals who have the habit of chewing on one side have more signs and symptoms of temporomandibular joint disorders, which are more common in adulthood and occur on the right side.[11,17] Symptoms often appear with clicking sounds and pain in the temporomandibular joint area.[17–22] The habit of chewing on one side is not influenced by gender, but women mostly feel the symptoms of temporomandibular joint disorders.[21] In a study conducted by Dipika and Fahmi on 52 patients who visited the Yogyakarta Muhammadiyah University Dental and Oral Hospital in February-March 2018, it was concluded that most of the samples had a bad habit of chewing on one side and had temporomandibular joint disorders.[21] In another study by Sari (2019), 90 students experienced one-sided mastication (100.0%). There was a relationship between one-sided chewing habits and temporomandibular joint disorders.[8] Medicine and Dentistry Students must be aware of maintaining health. They should know that unilateral chewing habits can cause occlusion disharmony. It can cause disorders of the temporomandibular joint.[8,13] Rachman et al. (2015) showed that a lot of students who chewed on one side experienced temporomandibular joint disorders. It could indicate that there are still many medical and dental students who are unaware of this.[1] Based on this description, the authors intend to examine the relationship between one-sided chewing and the occurrence of symptoms of temporomandibular joint disorders in students of Faculty of Medicine and Faculty of Dentistry, Universitas Jenderal Achmad Yani, Class of 2020.

METHOD

This research design uses an analytical study with a cross-sectional approach, where the dependent and independent variables will be observed in the same time period. This study was conducted to determine the relationship between one-sided chewing habits and the occurrence of symptoms of temporomandibular joint disorders in

students of the Faculty of Medicine and Faculty of Dentistry, Jenderal Achmad Yani University, Class of 2020.

Sample

The sampling technique that will be used in this study is non-probability sampling, the technique used is the consecutive sampling technique, where all data that meet the sampling criteria are included in the study until they meet the specified number of samples. In determining the sample size, the researcher used the formula for estimating the proportion of events to obtain a census of 245 students.

Research Instruments

The instrument used in collecting research data is the AAOP questionnaire by De Leeuw and Klasser, published in 2013 and converted into a google form, laptop or cellphone, quota or wifi.

Research Procedure

The research procedures were questionnaires adapted from the AAOP, making ethical license and permition, and distributing the form of Google forms links to all Class 2020 students at Jenderal Achmad Yani University. The data grouping is based on one-sided chewing and symptoms of temporomandibular joint disorders. The data processing was the relationship between temporomandibular joint disorders and one-sided chewing habits.

Data Analysis

Data from the research results were collected and then processed and analyzed statistically in the Statistical Package For The Social Sciences (SPSS). To analyze the relationship between the independent variable was the one-sided chewing habit of students. The dependent variable occurred in students of the Faculty of Medicine and Faculty of Dentistry, Universitas Jenderal Achmad Yani Class of 2020.

Place and Time of Research

The research was conducted at the Faculty of Medicine and the Faculty of Dentistry, Universitas Jenderal Achmad Yani from June to August 2021.

Research Ethical Aspect

This research includes human subjects, so they must consider ethical aspects to respect human dignity. To ensure confidentiality, fairness, and benefit, researchers must have a scientific attitude by applying the principles of fairness, justice, and humanity. The basic principles of applying health research ethics are respect for the person, beneficence, non-maleficence, and justice.[54]

RESULT

The results of this study discuss the relationship between one-sided chewing habits and the occurrence of symptoms of temporomandibular joint disorders in students of the Faculty of Medicine and Faculty of Dentistry, Universitas Jenderal Achmad Yani Batch 2020. The research sample obtained as many as 245 research censuses that matched the research criteria taken from primary data, namely by filling out a questionnaire in the form of a google form.

1. Characteristics of Respondents

The characteristics of respondents are divided by gender and age, as shown in Table 1.

Table 1. Characteristics of respondents

Variable	Total	(%)
Gender		
Man	70	28.57
Woman	175	71.43
Age		
18 years old	151	61.63
19 years old	88	35.92
20 years old	6	2.45
Total	245	100.00

Based on Table 1, it can be seen that the number of female students in this study was more than male students. From a total of 245 respondents, it is known that the majority of respondents are 18 years old, 61.63%, 19 years old, 35.92%, and 20 years old 2.45%.

The results of this study are similar to Dewanti's (2009) results in the occurrence of symptoms of temporomandibular joint disorders more in women than men.[55] The results of research by Abdulwahed and Mahmoud in 2015 in Saudi Arabia also found a high prevalence of temporomandibular joint disorders.[56] This study is the same as the research conducted by Ginting and Mawar (2019), with a sample of 33 people aged 18-24 years. It was found that temporomandibular joint disorders were more common at 18-19 years old.[23]

2. Distribution of Respondents Based on One-Side Chewing Habits

The distribution based on one-sided chewing habits can be seen in Table 2.

Table 2. Distribution of respondents based on one-side chewing habits

One-sided chewing habit	Total	(%)
Don't have	56	22.86
Have	189	77.14
Total	245	100.00

Based on Table 2, it can be seen that of the total respondents, namely 245 students, the majority of respondents experienced the habit of chewing on one side. The results of this study are the same

as those of Mawar (2019), which found the highest supporting factor for temporomandibular joint disorders in the form of chewing on one side, namely 48.5%.[45] Another study conducted by Mirna in 2019 in Indonesia, where it was found that the percentage who had the habit of chewing on one side was 57.4%.[40]

3. Distribution of Respondents Based on Symptoms of Temporomandibular Joint Disorders

The distribution of respondents based on symptoms of temporomandibular joint disorders can be seen in Table 3.

Table 3. Distribution of respondents based on symptoms of temporomandibular joint disorders

Variable	Total	(%)
Temporomandibular joint disorders		
Don't have	34	13.88
Have	211	86.12
Total	245	100.00

Based on Table 3, it was found that more respondents experienced temporomandibular joint disorders were more than respondents who did not experience them. The results of this study are the same as the research conducted by Mieszko et al. in 2014 in Poland, and this study explains that most of the respondents experience temporomandibular joint disorders.[57]

4. Relationship of One-Side Chewing Habits To Occurrence Of Temporomandibular Joint Disorders

Statistical analysis to determine the relationship between one-sided chewing habits on the occurrence of temporomandibular joint disorders, can be seen in Table 4.

Table 4. The Relationship of one-side chewing habits on the occurrence of temporomandibular joint disorders

One-sided chewing habit	Temporomandibular joint disorders				Total		*p*
	Don't have		Have				
	n	%	n	%	n	%	
Don't have	13	23.21	43	76.79	56	100.00	0,021
Have	21	11.11	168	88.89	189	100.00	
Total	34	13.88	211	86.12	245	100.00	

Desc: Chi-Square test is significant p<0.05

The statistical analysis used in this study is the Chi-Square test. Table 4 above shows that respondents who do not experience the habit of chewing on one side and do not experience temporomandibular joint disorders are 23.21%. In comparison,

respondents who experience the habit of chewing on one side and do not experience temporomandibular joint disorders 11.11%. Most respondents with chewing on one side experienced temporomandibular joint disorders, 88.89%. While respondents who did not experience the habit of chewing on one side and experienced temporomandibular joint disorders were 43 people (76.79%).

DISCUSSION

The masticatory system consists of the teeth, temporomandibular joints, chewing muscles, and the nervous system. The muscles are moved by nerve impulses due to pressure from the lower teeth in contact with the upper teeth so that the mandible can carry out the functional activities of the masticatory system. Normal occlusion and mandibular position will be stable if the components involved conduct their activities normally, in harmonious and balanced interaction.[15]

The temporomandibular joint is a complex joint that connects the upper jaw to the lower jaw, which connects the temporal bone to the head of the mandibular condyle, which is covered by fibrous tissue.[23,24] The articulation between the mandible and cranium allows for joint movement, namely rotational (ginglymoid) and gliding (arthrodial) movements referred to as ginglymoarthroidal joints.[2,5] The temporomandibular joint consists of hard tissue. It is the condyle bone, mandibular fossa, articular eminence. The soft tissue is the articular disc. The ligaments are the discal ligament, capsular ligament, temporomandibular ligament, sphenomandibular ligament, stylomandibular ligament, masticatory muscles, temporal muscle, masseter muscle, medial pterygoid muscle, lateral pterygoid muscle and neck muscles.[2,4,24,25,26]

The condyle is the part of the mandible at the vertical apex of the mandibular ramus. It forms a joint with the temporal bone or glenoid fossa called the temporomandibular joint.[13,15,27] The condylar bone structure is ellipsoid in shape with a narrow neck and connected to the mandibular ramus 15-20 mm long from side to side and 8-10 mm thick from front to back.[28] However, the condyles have different shapes and sizes for each individual due to age, facial type, malocclusion type, gender, and occlusal power.[13,15,27] The head of the condyle is classified into five types, namely crooked finger, round (round), pointed, angled (angled), and flat (flattened).[28]

As the center of mandibular movement, the condyle has a complex relationship with the surrounding tissue.[29]

Injuries in the temporomandibular joint can be grouped into three major groups: contusions, dislocations, and condyle fractures.[29] The position of the condyle in the normal temporomandibular joint is in the center of the mandibular fossa and articular disc.[32] During translation, the flexible disc and meniscus can move anteriorly along the condyle.[13] In abnormal conditions such as chewing on one side, the condyle of the more active part will receive a greater burden and pressure.[13,15] The superior condyle will not be right with the meniscus, which will cause joint sounds.[13] The most common features of the head of the condyle found in patients with temporomandibular joint disorders are flattening, erosion, osteophyte, and sclerosis.[27,28]

The articular disc is a fibrocartilage tissue that contains few blood vessels and nerves, is round and oval, and is located between the condyle and the glenoid fossa.[11,30]

The articular disc is divided into three parts: anterior, intermediate, and medial. The anterior and posterior disc structures are thicker than those in the intermediate zone (pars media). Therefore, the morphology will appear biconcave in the sagittal section. This shape will accommodate the shape of the condyle and the fossa it borders.[30]

The articular eminence is one of the hard tissue components of the temporomandibular joint that forms the anterior border of the glenoid fossa and is a continuous and convex transverse bony prominence.[3,4,23,31] This bone is the largest functional component of the temporomandibular joint.[3,4] When opening the mouth maximally, the condyle will move to the top of the articular eminence.[3] Fossa depth and articular development vary depending on condylar stimulus.[31] If there is excessive pressure, the articular eminence will cause wear and tear.[31] Joint sound occurs when the discussion fails to maintain its position between the head of the condyle and the articular eminence.[4] Along with increasing age, there will be a decrease in articular eminence.[32]

The joint space is between the mandibular fossa, the condyle, and the disc. This space is divided into two, namely, the inferior and superior spaces. A person's articular discs without internal temporomandibular joint disorders are located in the anterior joint space along the anterosuperior aspect of the condyle.[3,33]

The glenoid or articular fossa is a hollow oval-shaped temporal bone that articulates with the mandible. The most common temporomandibular joint disorders are disc-condyle relationships, articular eminences, and abnormal glenoid

fossa. The condyle moves superiorly to the glenoid fossa. It is if there is pressure on the soft tissue around the temporomandibular joint. In someone who has a habit of chewing on one side, the position of the condyle and the glenoid fossa will change.[2-4,30]

Ligaments are made of collagenous connective tissue that can't stretch so that it will limit joint motion. But when excess pressure is applied to the ligaments suddenly or for a long time, the ligaments lengthen. It will change the function of the joints and ligaments or compromise (compromised).

There are three functional ligaments and two accessory ligaments of the temporomandibular joint: the discal ligament, capsular ligament, temporomandibular ligament, sphenomandibular ligament, and stylomandibular ligament.[2,3]

Discal ligaments are composed of non-stretchable collagenous connective tissue fibers and limit the disc's movement away from the condyle. This ligament is divided into two: the medial disc ligament attaches the medial edge of the disc to the medial pole of the condyle, and the lateral discal ligament attaches the lateral edge of the disc to the lateral pole of the condyle. These ligaments' vascular supply and innervation provide information on joint movement and position. If the disc ligaments are strained, it will cause pain. The discal ligaments are responsible for the hinge movement of the temporomandibular joint.[2]

The temporomandibular joint is surrounded by capsular ligaments that cover and protect the joint to retain synovial fluid. In addition, these ligaments can resist the medial, lateral, or inferior forces that separate the articular surfaces. The ligamentous fibers attach to the neck of the condyle and superiorly to the temporal bone along the junction of the articular surfaces of the articular eminence and the mandibular fossa.[2]

The temporomandibular ligament consists of strong and tight fibers and two parts, the outer oblique and the inner horizontal. This ligament functions as a retrodiscal tissue from trauma because the condyle moves posteriorly. The oblique outer portion resists excessive condylar descent and limits the width of the mouth opening, thereby influencing mandibular movement during the normal opening. This outer portion extends from the outside of the posteroinferior articular and zygomatic tubercle to the outer surface of the condylar neck.[2]

The deep horizontal portion may limit the posterior movement of the condyle and disc. This section can protect the lateral

pterygoid muscle from lengthening or strengthening. This deep horizontal section extends from the surface of the outer articular tubercle and zygomatic process posteriorly and horizontally to the lateral condyle and posterior articular disc.[2]

The sphenomandibular ligament arises from the sphenoid spine and extends lingually to a small bony prominence on the medial surface of the mandibular ramus. This ligament does not limit mandibular movement significantly.[2]

The stylomandibular ligament arises from the styloid process and extends down and to the posterior border of the mandibular ramus. This ligament limits the excessive protrusive motion of the mandible. When you open your mouth, the stylomandibular ligament relaxes. And vice versa, if you close your mouth, this ligament becomes tight.[2]

The main blood vessels of the temporomandibular joint are the posterior superficial temporal artery, the anterior, middle meningeal artery, and the internal maxillary artery. The condyle receives its vascular supply from its bone marrow space via the inferior alveolar artery and feeder's vessel. The sensory nerves to the temporomandibular joint are from the auriculotemporal nerve and the masseter nerve, a branch of the mandibular nerve (V3).[2]

Muscles control the temporomandibular joint, especially the masticatory muscles located around the jaw and the temporomandibular joint, namely: the masseter muscle, temporal muscle, lateral pterygoid muscle, medial pterygoid muscle, and digastric muscle.[3]

The masseter muscle is from the zygomaticus arch. It inserts on the masseteric tuberosity at the angle of the mandible. The muscle is divided into superficial pars with muscle fibers running obliquely and deep pars muscle fibers running vertically from the inner surface of the zygomatic process of temporalis and the fascia temporalis. The masseter is a strong quadrilateral muscle that closes the jaw by lifting the mandible. A person can chew well and efficiently because of the masseter muscle contraction. The n innervates this muscle. massetericus.[3.34]

This fan-shaped muscle originates in the temporal fossa and from the temporalis fascia, inserted into the coronoid process of the mandible. The temporalis muscle has functioned as a muscle that lifts the lower jaw in a vertical or retrusive direction depending on which part is experiencing contraction. The innervation of this muscle is from the temporalis ramus deep.[3.34]

The first part originates from the lateral surface of the pterygoid plate lateral

to the pterygoid process. It inserts into the pterygoid fovea. The second is from the infratemporal surface. The infratemporal crest of the sphenoid bone extends to the articular disc. This muscle is resistant to damage and contracts slowly but continuously, so it is called the slow fiber component. It's innervation by n. Pterygoid lateralis.[3,34]

The medial pterygoid muscle is rectangular. It has a superficial and deep head originating from the pterygoid fossa extending to the angle of the mandible and inserting into the pterygoid tuberosity at an angle to m. lateral pterygoid, which gets innervation from n. medial pterygoid. This muscle functions to lift the mandible and push it forward, plays a role in lateral displacement of the mandible and takes part in rotational movements.[3,34]

The digastric muscle is divided into anterior and posterior parts. When the swallowing process and the mandible are stable, the hyoid bone is lifted by the digastric muscle along with the infrahyoid and suprahyoid muscles.[3]

The opening movement of the mandible begins when the teeth leave contact with their opposites, and the mandible descends.[4] When opening the mouth, the collagenous layers and articular discs tightly bound to the anterior-posterior condyles follow the gliding of the condyles.[35] The disc is attached to the articular fossa on the anterior surface of the articular eminence by elastic fibers that allow the disc to maintain its position to the condyle when closing and opening the mouth. Under normal circumstances, when opening the mouth, the condyle moves anteriorly because of the pull of the superior lateral pterygoid muscle and stretching of the superior retrodiscal ligament. The disc will rotate posteriorly to the condyle.[4,11] The condyle remains in the intermediate zone (the thinnest part of the articular disc) because of the interarticular pressure exerted by the mouth-opening muscles. When the mouth is wide open, the condyle moves translationally inferior to the articular emones. The biconcave of the disc lies between the articular fossa and the condyle were against the intermediate zone during all phases of opening and closing the mouth.[4,36]

the mandible closing movement occurs when the temporalis muscle, masseter muscle, and medial pterygoid muscle Contractions. It will launch the condyle posteriorly to merge with the disc. In contrast, the lateral pterygoid muscle relaxes, so the disc moves posteriorly and rises on the temporal bone along the condyle.[34,35] Digastric muscle also helps in maintaining tooth contact during normal occlusion.[35] The sliding contact of the

maxillary and mandibular teeth greatly determines the position of the mandible during mouth-closing movements. If there is premature contact, the final position will deviate from the normal movement pattern.[36] Clicking can occur at this time. Before closing the mouth when the disc moves backward in a different direction.[35]

Protrusion or anterior motion occurs due to contraction of the masseter muscle and lateral pterygoid muscle in the inferior head, pulling the mandible anteriorly.[5] To prevent the mandible from detaching, the disc and condyle move downward and forward along the joint surface without rotation of the transverse axis.[34] For depression balance. -retraction, the muscle begins to contract. During protrusion, the lower teeth exceed the position of the upper teeth pulled by the lateral pterygoid muscle when the position of all teeth is stopped.[11,34,35]

Retrusion motion or movement to the posterior occurs due to the contraction of the horizontal fibers of the temporalis muscle. The masseter assists this movement and posterior temporalis muscle fibers resting. To keep the mandible in a horizontal position, the geniohyodeus, digastric and elevator muscles contract. The mandibular condyle and disc are translated without significant rotation during retrusion. The function of this movement is to prevent the mouth from opening and protrusion excessively. [11,34,35]

Lateral movements often occur together with translational and rotational movements of the joint. This movement involves the condyle and disc moving downward in the sagittal and medial planes in the horizontal plane. At the same time, the other condyles rotate laterally in the sagittal plane and move from side to side in a horizontal plane fixed in the fossa. [11,34]

The etiology of temporomandibular joint disorders is multifactorial. But usually due to anatomic, trauma, psychological, genetic, age, and gender.[2,3]

The components of the masticatory system, namely the temporomandibular joint, teeth, and muscles, must work in a balanced manner and maintain harmony. Otherwise, it will cause temporomandibular joint disorders.[2] Occlusal conditions that can affect temporomandibular joint disorders are loss of posterior teeth in one jaw, deep bites, decay, attrition, abrasion, crowding, and fillings that are too high or too low.[3]

Psychological factors are related to depression, excessive anxiety, and emotional stress, which can cause increased muscle activity to become tenser. If stress is prolonged, the muscles will experience fatigue, and this can cause pain in the

temporomandibular joint area. In productive ages who experience temporomandibular joint disorders, cortisol hormone levels tend to be higher than normal.[3,37]

Genetic factors can be a factor in the occurrence of temporomandibular joint disorders, namely the presence of genes related to the pain aspect of catecholamine-o-methyltransferase (COMT).[3]

Trauma is a factor in temporomandibular joint disorders and can be categorized into macrotrauma and microtrauma. Macrotrauma occurs suddenly and directly, resulting in changes to the articular disc and condylar processes such as accidents and dental procedures – iatrogenic or hit. Microtrauma occurs due to excessive pressure on the jaw and muscles of mastication that lasts for a long time. This trauma changes the position of the disc and condyle slowly. Microtrauma occurs by various bad habits, such as biting pencils, pens, lips or nails, bad posture habits, jaw playing habits, chewing gum, parafunctional habits, and one-sided mastication.[3]

Bad habits of jaw playing such as biting pencils, pens, lips, nails, chewing gum or poor body position such as supporting the chin, can cause temporomandibular joint disorders due to muscle contraction and placing the condyle in the inner anterior region.[3] Temporomandibular joint prevalence is 83.3%, and those with a nail-biting habit are 89.2%.[3,38,39]

Parafunctional habits are behaviors outside normal functions involving the mouth, tongue, and jaw, such as bruxism and clenching.[38] Bruxism is a bad habit of grinding teeth, often done at night. There are two kinds of bruxism, namely awake bruxism, and sleep bruxism. The incidence of bruxism in the population is 5-20%.[3] Clenching habit is to bring the upper and lower teeth together with a prevalence of 96.7%.[39] This activity does not cause permanent damage to the masticatory system. Still, if this bad habit is carried out continuously, If it continues for a long time, it will lead to temporomandibular joint disorders. [3,38,39]

Chewing on both sides of the jaw is ideal for balancing masticatory and muscular functions.[3] Muscles and joints perform periods of activity and rest alternately.[11,40] Chewing on one side, known as unilateral mastication, can cause unbalanced stimulation of dentofacial growth and development. The stomatognathic system can cause excessive load or hyperactivity in the contralateral joint and muscles on the ipsilateral side, especially the lateral pterygoid muscle that opens and closes the jaw, causing pain. This

mastication causes the muscles on the working side to work harder, especially the temporalis, masseter and buccinator muscles.[2,3,41] Meanwhile, the muscles on the balancing side have low muscle tone and experience elongation, resulting in visual asymmetry.[11,40]

One-sided chewing influences the masticatory muscles more than the condyle structure.[3] According to Caldas, in 2016, the prevalence of one-sided chewing habits was 45-97% of the global population.[40] The results of a one-sided chewing study conducted on students of the Faculty of Dentistry, University of Sumatra North got 57.1% and those who chewed on both sides 42.9%.[40] Chewing on one side is strongly influenced by the habits of the individual himself, although in someone with bilateral mastication there will be one side that is mostly used for chewing. Several factors support the one-sided chewing habit, namely factors of masticatory muscle abnormalities, and psychological and tooth loss.[2,3,11,41]

The main clinical signs and symptoms of temporomandibular joint disorders are impaired muscle and joint function in pain, limited mouth opening and masticatory disorders, joint sounds such as clicking and crepitus, hearing loss/ear pain, dizziness and headaches.[2,3,12,42] Symptoms of temporomandibular joint disorders can interfere with daily activities, psychosocial functioning, and quality of life.[12] According to an epidemiological survey of individuals with temporomandibular joint disorders, 75% have at least one symptom.[12] Research conducted by Lung et al. on university students in Australia showed a moderate prevalence high that is 77.2%.[12]

Signs and symptoms of temporomandibular joint disorders often occur with joint sounds such as clicking by 70-80%. Clicking or clicking sounds in the joints occur due to changes in the location, function, and shape of the components of the temporomandibular joint due to excessive loads that last for a long time. This sound can occur when opening or closing the mouth is called a single click, while the sound that occurs when opening and closing the mouth is called reciprocal clicking. Clicking can also occur when a person just before closing the mouth because the disc moves posteriorly in a changed direction.[2,31]

Clicking is one of the symptoms of temporomandibular joint disorders that some people often do not realize, so it can increase the prevalence rate. [4,23,39] Most cases of clicking are caused by disc displacement. They can be accompanied by joint pain, headache, neck pain, limitations in opening the mouth, or sensitivity to the condyle or muscles of mastication or not.

Clicking can occur due to several things, namely changes in occlusion, bad posture habits, and one-sided chewing habits. [4,31,43] The incidence of clicking accompanied by pain in patients with temporomandibular joint disorders is 50%. It has a fairly high clicking incidence rate of 55.65%.[4]

Temporomandibular joint disorders can be cured if the diagnosis and treatment plan is established correctly.[28] The temporomandibular joint is diagnosed as having a disorder if one or more signs. Its symptoms appear, which can be determined by standard examinations, namely anamnesis or subjective examination, behavioural or behavioural assessments.[35,44] Physical examination that can determine temporomandibular joint disorders is palpation of the temporomandibular joint and surrounding muscle tissue which aims to determine the symmetry of mandibular movement and the presence or absence of pain, measuring the distance of mandibular displacement for knowing whether there are limitations or difficulties in opening the mouth and auscultation or detecting joint sounds to determine whether there are joint sounds or not, this can be identified using light digital palpation or a stethoscope.[42,45] Ancillary radiographic examinations that can be performed are panoramic, transcranial, CT scan, and MRI.[45]

Clinical symptoms in someone with temporomandibular joint disorders, Research Diagnostic for Temporomandibular Disorders (RDC/TMD) classifies it into three: disorders of the muscles, articular discs and articular bones.[45,46] The AAOP questionnaire recommended by the American Dental Association can be used to assist in the early identification of signs and symptoms and in diagnosing and screening patients with joint disorders.[45–47]

The temporomandibular joint disorders prevalence and severity is determined from two indices. They are anamnestic index (Ai) and examination of clinical signs or physical examination using the Clinical Dysfunction Index (Di) proposed by Helkimo et al.

The Ai is used to classify individuals according to the severity of temporomandibular joint disorders (no disturbance, mild, moderate, and severe.[48–51] According to Helkimo's Anamnestic Index (Ai), symptoms of temporomandibular joint disorders consist of three levels: Ai0 = no symptoms, AiI = mild symptoms such as joint sounds, AiII = severe symptoms such as difficulty in opening and closing the mouth.[52,53] Meanwhile, Helkimo's Clinical Dysfunction Index (Di) is based on the degree of severity into four categories and evaluated based on five signs, namely: Di0

= Range of Motion, DiI = abnormal function of the temporomandibular joint, DiIII = muscle pain, DiIII = pain in the temporomandibular joint, and pain on mandibular movement.[52,53]

The Craniomandibular Index (CMI) assessment index looks at temporomandibular joint disorders as a continuous variable that contains everything needed to complete the Helkimo Index. [45.51] CMI is divided into two sub-indices: Dysfunction Index (DI) and Muscle Index (MI).[51] The DI value is the degree of joint dysfunction, and MI measure the number and location of muscles felt on palpation. CMI is the average of DI and MI, whose rating scale varies between 0 and 1, with a value of 1 being the highest value.[45,51] Himawan et al. have developed an index, namely the TMD Diagnostic Index (TMD-DI), which aims as an easy reference, fast, simple, and accurate for the initial screening of temporomandibular joint disorders.[48]

The statistical tests were obtained with a $p = 0.021 < 0.05$. It can be concluded that there is a relationship between one-sided chewing habits and the occurrence of symptoms of temporomandibular joint disorders in students of the Faculty of Medicine and Faculty of Dentistry, Jenderal Achmad Yani University Class of 2020.

This result is in line with research conducted by Darma Sari in 2019 at the University of 'Aisyiyah Yogyakarta, where all experienced a bad habit of chewing on one side (100%). From this study, it was concluded that chewing on one side can cause the masticatory muscles to experience an imbalance so that the onset of pain, discomfort chewing on the other side and disturbances to the structure of the joints and related muscles.[8]

The same results were obtained from research conducted by Randika et al. in 2015 at the Faculty of Medicine, Islamic University. The study stated that the incidence of temporomandibular joint disorders was quite high, namely 61%, with the main cause being bad habits.[1] Different results were obtained from research conducted by Laura S Himawan et al. in 2018 at the University of Indonesia, which stated that chewing on one side is not related to the severity of temporomandibular joint disorders and the shape of the condylar imbalance.[58]

Another similar study was from Dipika and Fahmi in 2018 at the Dental and Oral Hospital, University of Muhammadiyah Yogyakarta. This study states that samples who experience the habit of chewing on one side tend to experience symptoms of temporomandibular joint disorders. This research was conducted with two events, namely the Anamnastic Index,

a personal history questionnaire, and the Dysfunctional Index, which is a direct physical/clinical examination of the sample. [21]

CONCLUSION

The conclusions are 77.14% of respondents who experience the habit of chewing on one side, and respondents who experience symptoms of temporomandibular joint disorders due to the habit of chewing on one side are as many as 88.89%. There is a significant relationship between the habit of chewing on one side of the occurrence of temporomandibular joint disorders (p=0.02).

CONFLICT OF INTEREST

A questionnaire only determined the diagnosis of temporomandibular disorders found in research subjects without a direct physical examination.The research was conducted online by distributing questionnaires through a g-form so that researchers could not assist in filling out the questionnaires because they were currently in the Covid-19 pandemic.

ACKNOWLEDGEMENT

Our gratitude to Faculty of Dentistry Universitas Jenderal Achmad Yani and several parties helped with this research.

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