



St Paul's Hospital Millennium Medical College  
Department of Dental and Maxillofacial Surgery

Patterns of temporomandibular disorders among patients at a tertiary hospital,  
Central Ethiopia: a 10-year retrospective study

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Pattern of temporomandibular disorders among patients attended at St. Paul's Hospital Millennium Medical College (SPHMMC), Central part of Ethiopia: a 10-year retrospective study

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**Approval**

This is to certify that the thesis prepared by Dr. Tigist Abi entitled Pattern of temporomandibular disorders among patients attended at St. Paul's Hospital Millennium Medical College (SPHMMC), Addis Ababa, Ethiopia: a 10-year retrospective study and submitted in partial fulfillment of the requirements for the specialty in Oral and Maxillofacial Surgery complies with the regulations of the College and meets the accepted standards with respect to originality and quality.

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## **List of Abbreviations**

|         |                                                            |
|---------|------------------------------------------------------------|
| DC/TMD  | Diagnostic Criteria for Temporomandibular Disorder         |
| RDC/TMD | Revised Diagnostic Criteria for Temporomandibular Disorder |
| SPHMMC  | Saint Paul's Hospital Millennium Medical College           |
| TMD     | Temporomandibular Disorder                                 |
| TMJ     | Temporomandibular Joint                                    |

## ABSTRACT

**Background:-** Temporomandibular disorders (TMDs) are frequent pathological disorders encompassing a broad range of pathologies of the temporomandibular joint (TMJ), masticatory muscles and related structures. The prevalence of TMD has been comprehensively studied over the years around the world. However, in Ethiopia, studies in this area are scarce. The aim of this research was to assess the past ten years pattern of TMDs among patients attended SPHMMC, Addis Ababa, Ethiopia.

**Methods:** This was a cross-sectional study based on review of medical records of patients during the past ten years. Data was collected by reviewing the medical records of patients who visited the department of dental and maxillofacial surgery from January 2011 to December 2020 G.C by using a pre-prepared checklist and analyzed using SPSS v.26.

**Result:** The findings of this study revealed that TMDs were more frequent in females (64%) than in males (36%). It was observed that TMDs are more common (28%) among patients in the age range of 21-30 years. Trauma, psychological problems, parafunctional habits, systemic disease and malocclusion were the main causes of TMDs. joint pain, Clicking sound, difficulty of mouth opening, ear pain, headache, tinnitus and difficulty of chewing, were mainly reported clinical signs and symptoms. These clinical manifestations or signs and symptoms were reported as more prevalent among female patients (47.3 %) as compared with male patients (27.4 %). The most usual treatments provided to patients with TMD were conservative treatment 241 (90.6 %) patients followed by open joint surgery 4 (1.5 %).

**Conclusion:** The study concludes that TMDs are more common in females and the younger age groups. The study recommends for females and younger age groups beyond the usual application of conservative treatment, raising awareness for patients, counseling, self-care and stress managements are recommended.

**Key words:** Temporomandibular disorder, Trauma, psychological problem, parafunctional habits, clicking sound, joint pain and conservative treatment.

# **1. Introduction**

## **1.1. Background**

The stomatognathic system includes various anatomical structures which allows the mouth to open, swallow, breath, suck, phonate and to perform different facial expressions. This system comprises of the temporomandibular joint (TMJ), jaw and mandible, muscle tissues and tendons, dental arches, salivary glands, as well as the hyoid bone and the muscles that connect the latter to the scapula and the sternum, the muscles of the neck (1). TMJ is a bilateral, diarthrodial joint in the maxillofacial region that is formed between the condyle of the mandible and the fossa of temporal bone (2) (3). The combination of hinge and sliding motions makes the joint different and complicated among other joints in the body and it has a complex movement, and unique makeup (1).

Temporomandibular disorders (TMD) are clinical problems involving the masticatory musculature, the temporomandibular joints, and associated structures, or both (4). TMD is a complex multisystem disorder that is affected by many interacting factors, and strong consideration should be given toward a multidisciplinary diagnostic and treatment approach. Thus, Dentist, physical therapist, orthodontist, neurologist, psychologist/psychiatrist, anesthesiologist, and oral and maxillofacial surgeon are an ideal TMD treatment team (5).

Temporomandibular disorder is classified into non-articular and articular categories and has been described by de Bont and colleagues (4). Non-articular disorders include muscle disorders such as myofascial dysfunction, muscle spasm, and myositis. Articular disorders, often accompanied by internal derangement, non-inflammatory and inflammatory arthropathies, growth disorders, and connective tissue disorders (5). Non-articular TMJ disorders most commonly manifest as masticatory muscle dysfunction. Approximately one half or more of all TMDs are forms of masticatory myalgia (6). It is evident that TMD is a significant and increasingly prevalent disorder found within the general population that appears more commonly in women and during the reproductive years (7).

Different factors, such as occlusal abnormalities, parafunctional habits, macro and micro trauma, psychosocial factors, and systemic diseases influencing the function of the joint result into hypo

mobility (disc derangements, adherence, adhesions) or hyper mobility, (subluxation and luxation) (8). As a consequence, a patient will present with pain, limitation and deviation in the mandibular trajectory, joint noises during oral opening, headache, neck pain, ear pain, ear fullness, tinnitus, and others (6). Therefore, successful management is dependent on identifying and avoiding potential pathologic factors (8).

There are several diagnostic systems for orofacial TMD and pain (9). The Diagnostic Criteria for TMD (DC/TMD) is commonly utilized in different studies and its development is well-described in the literature (10). The DC/TMD is developed based on extensive multicenter clinical studies including studies funded by the National Institutes of Health in the US and on international consensus conferences (9). The DC/TMD comprises two domains, a physical Axis I (diagnosis) and a psychosocial Axis II (psychosocial assessment). Axis I protocol includes its reliable and valid diagnostic criteria for common pain-related disorders and intra-articular disorders (9).

There are different types of treatment modality for TMD such as non surgical therapies, less invasive surgical therapies and open joint surgery (5). When a diagnosis of TMD is suspected or confirmed, therapy should be directed towards improvement of function and reduction of pain and discomfort. Sufficient literature is available to suggest that non-surgical treatment modalities may account for as high as a 74% to 85% favorable response rate in patients with TMD (11) (12). Suvinen and coworkers also reported that 81% of patients showed 50% or greater improvement after conservative physical therapy with a 6-month follow-up period (13).

Since of TMD is a multifactorial disorder and a frequent clinical presentation in our country in both gender and different age groups, the present study aims at assessing the pattern of TMD and the associated factors.

## **1.2. Statement of the problem**

Temporomandibular disorder is the general term used to describe the manifestation of pain and/or dysfunction of the TMJ and its associated structures. In general, up to 5% of the population is affected by TMD; and approximately 2% of the general population seeks treatment (14) (15). These conditions affect approximately 5% to 12% of the adult population. In children, the prevalence ranges from 9.8% to 80%, and the variation in frequency depends on the adopted diagnostic criteria. About 60–70% of the human population has at least one TMD symptom in their lifetime but only 5% of cases undertake the treatment (16).

Chronic pain is the overwhelming reason for seeking TMD treatment. If TMD remains untreated it may be associated with impaired general health, depression, or other psychological disabilities that affect the patient's wellbeing and quality of life (17). Thus, it can cause serious and disabling problems in mastication, digestion, speech, appearance, and hygiene. Consequently, it results in malnutrition, psychological stress, and poor oral hygiene (17).

Although TMD is a frequent occurrence in a clinical setting, the epidemiological status in Ethiopia is not adequately known. On top of that, there is a lack of well-organized treatment facilities and professionals for TMD and related problems. Therefore, this study is crucial, and it could be a steppingstone for further problem-solving studies.

### **1.3. Significance of the study**

This research will seek or inform ways and means through which patients with TMD will have better diagnosis and treatment. The result of this study can be used by researchers and students as an input for further research. It could also be used by professionals and officials to formulate treatment guidelines and protocols also assess the risk factors as well as fulfill and give attention for the required treatment facilities.

The overall purpose of this study is to assess the pattern of TMD, since there is no study available in our country that shows socio demographic, causative factors, duration, clinico-radiographic features and different intervention. This study could be an input for further studies and contribute to the scarce oral health data in Ethiopia.

## **2. Literature review**

In this section, TMD issues will be reviewed in order to establish a conceptual framework of the study. In the next subsequent sections; Epidemiology of TMD, Etiologies, Classifications, Imaging, Other Investigations and Treatment Modalities will be reviewed which are related to the study and discussed in detail.

### **Epidemiology of TMD**

Epidemiological studies in multiple countries (America, Sweden, Netherlands, Finland, Pakistan, India, Italy, Iran, Denmark, Brazil, United-Kingdom and Canada) have outlined a substantial prevalence of orofacial pain symptoms in the adult population, showing that approximately 5-60% of the population suffers from at least one of the signs of TMD (18) (19) (20). At least one sign of TMD is found in 40% to 75% of adults in the United States (21). In Sweden, some studies have shown a prevalence ranging from 4% to 7% of adolescents (22) (23) (24).

### **The changing epidemiology of TMD**

A large longitudinal cross-sectional study was carried out to look at possible trends in the prevalence of TMD symptoms in an adult population over two decades, from 1983 to 2003 (25). This study found a statistically significant increase in TMD prevalence over the 20 year period. According to the study TMD symptoms increased over the 20-year period from 27% to 38% (25).

### **Socio-demographic characteristics**

In general, it was determined from the studies selected for this review that women suffer more from TMD than men. This is consistent with many of the previous studies (26). A study conducted on university students in Brazil found that 68% of all subjects exhibited some degree of disorder with 43.7% of subjects exhibiting audible TMJ sounds (27). In this study the prevalence of TMD in women was almost four times greater than men. Many studies observed similar results and found that TMD seems to be far more prevalent in the female population.

Several cross-sectional studies have demonstrated that the overall prevalence of TMD is significantly higher in the 20-40-year age group when compared with other age group. Another

research looking at TMD in over 1000 young children (3-7 years) found that 14% of males and 18% of females suffered from TMD (28) (29).

A study of 4724 children (2353 girls and 2371 boys) in Sweden aged 5-17 years Headache was the only symptom of TMD reported by the children. The results showed that one or more clinical signs were recorded in 25% of the subjects, most of them being mild in character. The prevalence increased during the developmental stages. Girls were in general more affected than boys (30).

### **Etiologies and Classifications**

Andrea M. and Alina Monica P., et al. conducted a study in which the etiology of TMD is complex and multifactorial. There are numerous factors that can contribute to this disorder, which are grouped into three categories. Predisposing factors increase the risk of developing TMD, initiating factors cause the onset of the disease and perpetuating factors interfere with the healing process or enhance the progression of TMD. In some instances, a single factor may serve one or all of these roles. The successful management of TMD is dependent on identifying and controlling the contributing factors. They estimated that occlusal factors contributed about 10–20% to the total spectrum of etiological factors in TMD. Hormonal factors of TMD are four times more common among women studies in humans have shown that painful symptoms increase by 30% among patients on menopause. A study including 400 patients with TMD revealed that in 24.5% of them, the presence of TMJ pain was directly correlated with a history of trauma. In a study including 3,557 students, Miyake et al. identified parafunctional habits like bruxism and chewing gum on one side as risk factors for TMD (31).

In a prospective cohort study of 134 patients (82 with mandibular asymmetry and 52 without), there was a significantly higher prevalence of TMD in those with mandibular asymmetry (67.1%) compared to those without (40.4%). Myofascial Pain disorder only was present in 9.7%, TMJ disorder only in 29.9%, and both myofascial pain and TMJ disorders in 17.2%. The most prevalent type of TMD is disc displacement with reduction (77.6%), followed by myalgia (35.5%) and arthralgia (21.1%) (32).

A study conducted in India, a total of 1000 university students were enrolled in the study (550 females; 450 males), with ages ranged between 18 and 28 years. Results showed that prevalence of one or more symptoms of TMD was 27.7%, while the prevalence of one or more signs of TMD was 64.4% which was mild in severity. Mild symptoms were found in 19.8% and severe symptoms were found in 7.6%, while mild clinical sign, moderate clinical and severe clinical sign were found in 49.7%, 12.2% and 2.4% respectively. Regarding the association between TMD with anxiety and depression, 206 of the 311 students (66.2%) with TMD symptoms also had signs of anxiety and depression (33) (34).

The research was conducted in Finland University showed from the total of 1577 adults, TMJ clicking was found to be the most common clinical sign of TMD 15.4% followed by joint pain 2.7% and more than one sign 7.6%. The prevalence of every measured clinical sign of TMD was at least 60.2% more common in women than in men. Symptoms of TMD were observed in 246 (54%) students after clinical examination. The largest group involved students with disc displacement (women: n=132, 29%; men: n=70, 15%). In 289 (64%) students intraoral symptoms concerning occlusal parafunctions were observed. In 404 (89%) examined students, non occlusal parafunctions were recorded (35).

### **Imaging and Other Investigations**

The diagnosis of Temporomandibular joint Osteoarthritis (TMJ–OA) using panoramic radiograph (n=53, 14.5%) exhibited the lowest value compared with the other imaging modalities. The diagnosis rate of TMJ–OA based on cone beam computed tomography (CBCT) was 39.6% (n=141). The overall presence of reported TMJ pain (n=282, 77.3%) was closest to the results of bone scintigraphy (n=333, 91.2%), which was markedly high (36).

### **Treatment Modalities**

Comparison of the splint therapy and control groups revealed a significant difference in the change of Maximum Mouth Opening (MMO). TMD with splint therapy MMO increases (48.9%). Subgroup analysis showed that patients with TMD in the splint therapy group experienced a significant decrease in pain as compared to control 34.5% (37).

Based on a Network Meta Analysis of 48 Randomized control trials, there is moderate to very low quality evidence confirming the effectiveness of occlusal splint therapy in the treatment of

TMDs. The three highest-ranked treatments for post-treatment pain reduction in arthrogenous TMDs were anterior repositioning splint (ARS) (92%, very low quality evidence), counseling therapy and hard stabilization splint (CT+HSS) (67.3%, low quality evidence), and hard stabilization splint (HSS) alone (52.9%, moderate quality evidence). For myogenous TMDs, they were mini-anterior splints (86.8%, low quality evidence), counseling therapy and hard stabilization splint (CT+HSS) (61.2%, very low quality evidence), and hard stabilization splint (HSS) alone (59.7%, moderate quality evidence) (38).

The efficacy of arthroscopy has since been well-recognized and has been found that the therapeutic effect was mainly due to lysis and lavage. The sample consisted of 62 patients who underwent arthroscopic lysis and lavage (ASC-L) in 2015 and 2016. It included 6 men and 56 women with an average age of 34.37. A therapeutic effect maximum inter incisal opening (MIO over 34 mm) was recorded in 69% of cases 24 months after the ASC-L. Nonetheless, the work demonstrated the importance of subjective assessment, as 87% of patients perceived their condition as satisfactory after 24 months and not requiring further intervention, while 8 patients (13%) perceived it as unsatisfactory (39).

In a randomized controlled trial, 80 patients with arthralgia of the TMJ were randomly assigned to one of the two treatment groups. One group received arthrocentesis as initial treatment (n=40), the other group received conventional treatment including soft diet, physical treatment and occlusal splint therapy (n=40). Follow-up was after 3, 12 and 26 weeks post treatment. After 26 weeks, the TMJ pain had declined comparably in both groups (arthrocentesis, n=36; conservative treatment, n=36) and MMO (inter incisor distance in mm) had slightly improved (40).

### **3. Objective**

#### **3.1 General objective:**

To assess the pattern of TMDs among patients attended the department of dental and maxillofacial surgery in ten years period at SPHMMC in Addis Ababa, Ethiopia.

#### **3.2 Specific objectives:**

- To assess distribution of TMDs across the different socio-demographic characteristics from 2011-2020 G.C.
- To determine associated factors of TMDs from 2011-2020 G.C.

## **4. Methods and Materials**

### **4.1 Study area**

The study was conducted in the dental and maxillofacial surgery department at SPHMMC, Addis Ababa, Ethiopia. The department of dental and maxillofacial surgery in this hospital is one of the largest and pioneer centers that provide services related to oral and maxillofacial conditions in Ethiopia. There are seven maxillofacial surgeons, one head and neck surgeon, six dental surgeons and sixteen maxillofacial surgery residents. It has inpatient and outpatient services in average for four thousand eight hundred patients visit per year and provide minor and major maxillofacial related operations Monday to Friday and also emergency procedures at any time and date.

### **4.2 Study period**

The study period was from September 2021 to February 2022

### **4.3 Study Design**

A ten years retrospective descriptive cross sectional TMD patient's medical record review was conducted.

### **4.4 Population**

#### **4.4.1 Source population**

The source population was all medical records of temporomandibular joint problem patients who have been treated during the past 10 years at dental and maxillofacial surgery department of SPHMMC.

#### **4.4.2 Study population**

All medical records of patients for the last ten years with diagnoses of TMD at dental and maxillofacial Surgery department of SPHMMC were included in this study.

### **4.5 Inclusion and exclusion criteria**

All complete medical records with diagnoses of TMD which has clinical feature of pain on TMJ area, joint noise, difficult to open mouth, difficult to chew or tiredness for chewing were included in this study without any age or sex predilection. Temporomandibular problems other

than TMD: ankylosis, TMJ pathology (cystic lesion, benign and malignant tumors) and dislocation were excluded.

#### **4.6 Sample size and Sampling procedures**

Study sample included all patients with diagnosis of TMD seen at SPHMMC Department of dental and maxillofacial surgery in the study period.

All medical records with the diagnosis of temporomandibular problem from January 2011 to February 2020 G.C. were collected from registration book at the department. A total of 624 medical cards were reviewed. Of these 266 medical cards were fulfilled the inclusion criteria.

#### **4.7 Variables**

Age, gender, place of residence, duration of the case, etiology (trauma, stress, parafunctional habits, malocclusion, systemic diseases), clinical presentations (chronic facial pain, mouth opening limitation, difficult chewing, clicking or popping noises during opening and closing of mouth, headache, neck ache), imaging findings (loss of joint space, degenerative changes, normal articular structure) and type of treatment (conservative, less invasive type, open joint surgery) were considered as independent variables, whereas specific types of TMDs was dependent variables.

#### **4.8 Data collection procedure**

Data collection checklist was prepared by reviewing the existing medical records of the patients and relevant literature review on the subject area. The patient's Medical Record Number (MRN) was extracted from the registration book at the department of dental and maxillofacial surgery. Then it was used to collect the medical records from the hospital archive department. Once the medical records were at hand at the same time all the necessary data was extracted by using data collection checklist (Annex I) on paper without taking away the records.

Data was collected by four trained maxillofacial surgery residents (training was given for half day by principal investigator) under the supervision of the principal investigator.

#### **4.9 Data Analysis**

The collected data was cleaned, coded and transferred to SPSS version 26.0 windows software computer program for analysis. Descriptive statistics (frequencies and percentages) and crosstab across the variables were performed.

#### **4.10. Operational definition**

TMD is any problem related to TMJ and associated structures which lead to unspecified pain in the TMJ area, decrease range of mouth opening, below the normal opening range (3 - 4.5 cm), joint with popping or clicking sound during opening and closing of mouth and difficulty of opening and closing of mouth, afraid of moving the jaw, tiredness to chew, chewing food by anterior teeth to reduce joint noise.

Pattern means something repetitive distribution, for example how TMD distributed in different age group, How TMD occurred repeatedly in different sex.

#### **4.11. Data management and quality assurance**

The principal investigator monitored the data accuracy and completeness by counterchecking of collected data in randomly selected number of cases. All completed data collection forms were examined for clarity and consistency at the end of each data collection day.

#### **4.12. Ethical consideration**

Ethical clearance was obtained from Institutional Review Board of SPHMMC and permission was given from SPHMMC administration before the data collection begins. No information pertaining patient identification including names were recorded on the checklist to guarantee confidentiality of the patients. Data was stored in a password protected computer that is only operated by the principal investigator.

#### **4.13. Dissemination of results**

The finding of the study will be presented to all concerned bodies including SPHMMC, Department of dental and maxillofacial surgery, department of public health, and Ethiopian

ministry of health. The manuscript will also be submitted for peer reviewed journal for publication. It will also be presented at professional meetings/ conferences.

## **5. Limitation of the study**

In the process of collecting the data, the major limitation of this study was incompleteness of the patient's records and missed information. For instance, incomplete patient address registration was one problem since it was better to study patterns of TMDs with exact patient location in order to identify whether the rural or urban dwellers of the country are mostly affected by TMDs. But it was difficult to find proper patient address registration. To fill the gap, the investigator tried to use regional locations as recorded in the medical records. Seven records were found with different types of diagnosis in different follow up days. However, we tried to manage this by reading through the history and assign the most appropriate diagnosis of all as per our operational definition of TMDs. There were also three medical records which stated 'TMD' as diagnosis, and treatment with Ibuprofen without any further information so that they were discarded as they were found to be irrelevant in this study. Medical records with non-specified TMD diagnosis was also a problem, in addition to the issues mentioned above.

## 6. Results

A total of 624 medical records were reviewed. Of these, only 266 medical records fulfill the inclusion criteria.

### 6.1. Socio-demography

The data collection indicated that, from 266 medical records of patients with diagnosis of TMDs who visited the department of dental and maxillofacial surgery at SPHMMC, from January 2011 to December 2020 G.C; 171(64%) were females and 95(36%) were males. Regarding age, a distribution was made in five groups for both genders with a minimum age of 13 and maximum age of 94 with a mean age of 37 years and standard deviation of 17.174: zero to 10; 11 to 20; 21 to 30; 31 to 40; 41 to 50 and over 50 years old. The study indicated that TMDs with in age group of 21-30 years reported as 75(28%), >50 years old 52(20%), 11-20 years old 51(19%), 31-40 years old 49 (18 %), 41-50 years old 39 (15%) and < 10 years old were recorded as no case (0%).

Table 1 Gender, age and location distribution of TMDs

| Ser. N <sup>o</sup> | Demographic distribution | TMD Patients                    | Number | Percent |
|---------------------|--------------------------|---------------------------------|--------|---------|
| 1                   | Gender                   | Male                            | 95     | 36%     |
|                     |                          | Female                          | 171    | 64%     |
| 2                   | Age                      | ≤ 10                            | 0      | 0%      |
|                     |                          | 11 - 20                         | 51     | 19%     |
|                     |                          | 21 - 30                         | 75     | 28%     |
|                     |                          | 31 - 40                         | 49     | 18%     |
|                     |                          | 41 - 50                         | 39     | 15%     |
|                     |                          | > 50                            | 52     | 20%     |
|                     |                          | total                           | 266    | 100%    |
| 3                   | Address                  | Addis Ababa                     | 202    | 75.9%   |
|                     |                          | Southern nation and nationalits | 10     | 3.8%    |
|                     |                          | Amhara region                   | 10     | 3.8%    |
|                     |                          | Oromia region                   | 42     | 15.7%   |
|                     |                          | Afar region                     | 1      | 0.4%    |
|                     |                          | Tigray region                   | 1      | 0.4%    |

According to this study, as shown in the table 1 above, the majority of patients who attended the department of dental and maxillofacial surgery at SPHMMC, from January 2011 to December 2020 G.C; medical records of patients reported that 202(75.9%) of them located in Addis Ababa, 42(15.7%) come from Oromia region while from Amhara and Southern regions each accounts 10 (3.8 %).

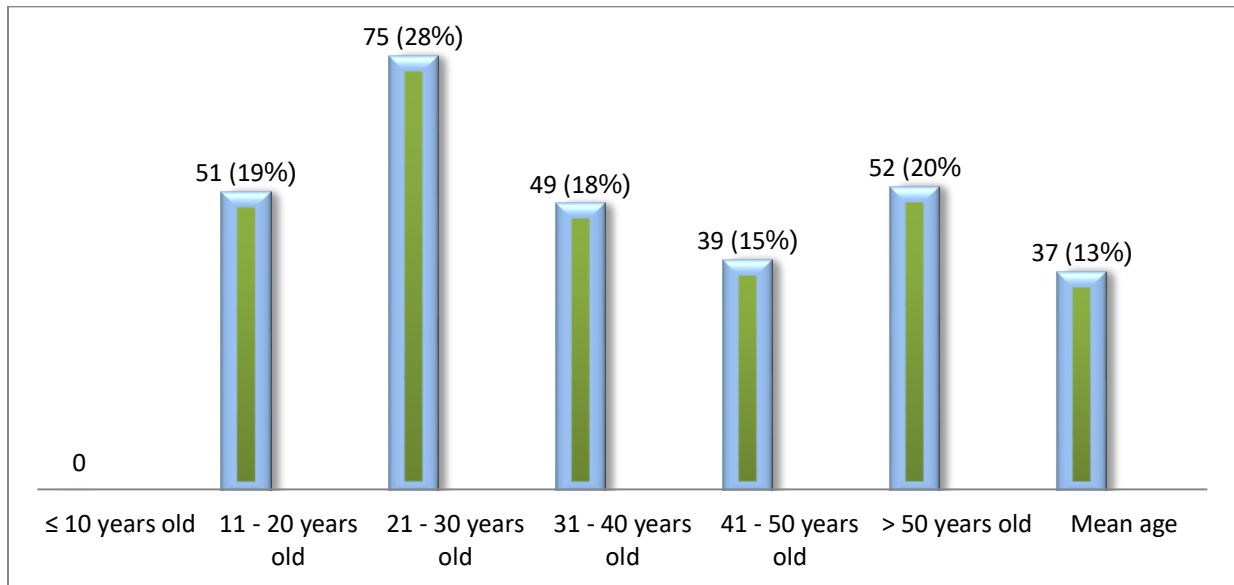


Figure1.Age pattern of TMD Patients

## 6.2. Etiology of TMDs

The causes of TMDs as shown in figure 2 below were: trauma 33(12.4%), psychological problem 119(44.7%), parafunctional habits 7(2.6 %), systemic disease 3(1.1 %), and malocclusion 33(12.4%) and others which were not specified 71(26.7%). And there is statistically significant correlation between TMDs and the causative factors.

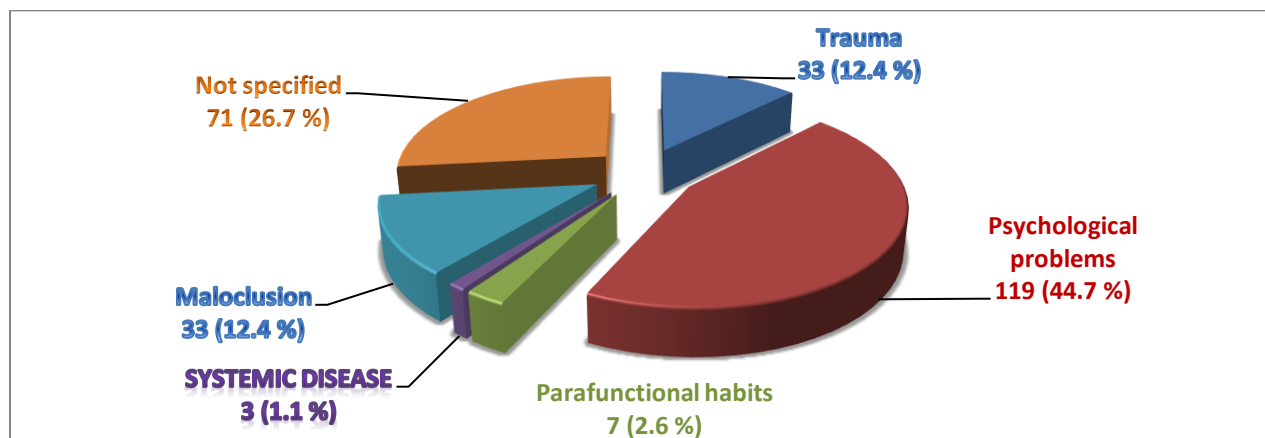


Figure 2. Etiology of TMDs

Table 2. correlation between TMD and etiological factors

| Spearman's rho | etiology of TMD | Correlation Coefficient | etiology of TMD | diagnosis |
|----------------|-----------------|-------------------------|-----------------|-----------|
|                |                 |                         | 1.000           | 0.210**   |
|                |                 |                         | Sig. (2-tailed) | .0003     |
|                | diagnosis       | Correlation Coefficient | N               | 197       |
|                |                 |                         | 0.210**         | 1.000     |
|                |                 |                         | Sig. (2-tailed) | .0003     |
|                |                 | N                       | 197             | 266       |

\*\*. Correlation is significant at the 0.01 level (2-tailed).

### 6.3. Sign and symptom

This study revealed that from the total of 266 medical record the following sign and symptom of TMD were documented clicking sound 123(46.2%), joint pain 146(54.8%), difficulty of mouth opening 85(31.9%), difficulty of chewing 11(4.1%), headache 7(2.6%), ear pain 9(3.3%), tinnitus 12(4.5%) and with more than one sign and symptom 127(47.7%).

Table 3 Duration, Sign and symptom of TMD Patients

| Ser. N <sup>o</sup> |                   |                               | Number | Percent |
|---------------------|-------------------|-------------------------------|--------|---------|
| 1                   | Sign and symptoms | 1.clicking sound              | 123    | 46.2%   |
|                     |                   | 2. joint pain                 | 146    | 54.8%   |
|                     |                   | 3.difficulty of mouth opening | 85     | 31.9%   |
|                     |                   | 4.difficulty of chewing       | 11     | 4.1%    |
|                     |                   | 5.headache                    | 7      | 2.6%    |
|                     |                   | 6.Ear pain                    | 9      | 3.3%    |
|                     |                   | 7.tinnitus                    | 12     | 4.5%    |
|                     |                   | 8.more than one symptom       | 127    | 47.7%   |
|                     |                   | Female                        | 126    | 47.3%   |
|                     |                   | Male                          | 73     | 27.4%   |
| 2                   | Duration          | Acute                         | 106    | 39.8%   |
|                     |                   | Chronic                       | 160    | 60.2%   |

As described in the table 3 above; patients medical record of 160(60.2%) reported that chronic pain (duration was more than three months) whereas 106(39.8%) reported with acute TMDs.

#### 6.4. Diagnosis of TMD patients

Table 4 Distribution of TMD patients' diagnosis reported on both genders

| Diagnosis                     |                         |            | Number | Percent |
|-------------------------------|-------------------------|------------|--------|---------|
| Internal derangement of joint |                         | Unilateral | 6      | 2.3%    |
|                               |                         | Bilateral  | 0      | 0       |
| Degenerative joint disease    | Osteoarthritis          | Unilateral | 1      | 0.4%    |
|                               |                         | Bilateral  | 0      | 0       |
|                               | Arthritis               | Unilateral | 3      | 1.1%    |
|                               |                         | Bilateral  | 2      | 0.8%    |
| Condylar bone fracture        | Intra capsular fracture | Unilateral | 1      | 0.4%    |
|                               |                         | Bilateral  | 0      | 0       |
|                               | Extra capsular fracture | Unilateral | 4      | 1.5%    |
|                               |                         | Bilateral  | 1      | 0.4%    |
| Myofacial pain                |                         | Unilateral | 61     | 22.9%   |
|                               |                         | Bilateral  | 6      | 2.3%    |
| Not specified (TMD)           |                         | Unilateral | 157    | 59%     |
|                               |                         | Bilateral  | 24     | 9%      |
| Total                         |                         |            | 266    | 100%    |

## 6.5. Types of imaging and radiological findings

A total of 266 medical records of patients revealed that for 152(57.1%) of them OPG were ordered while 114(42.8%) were not ordered for imaging. Regarding radiological findings, 8(3%) decreased joint space and condyle fracture 6(2.3%) were reported while on 32(12%) of them results were not stated.

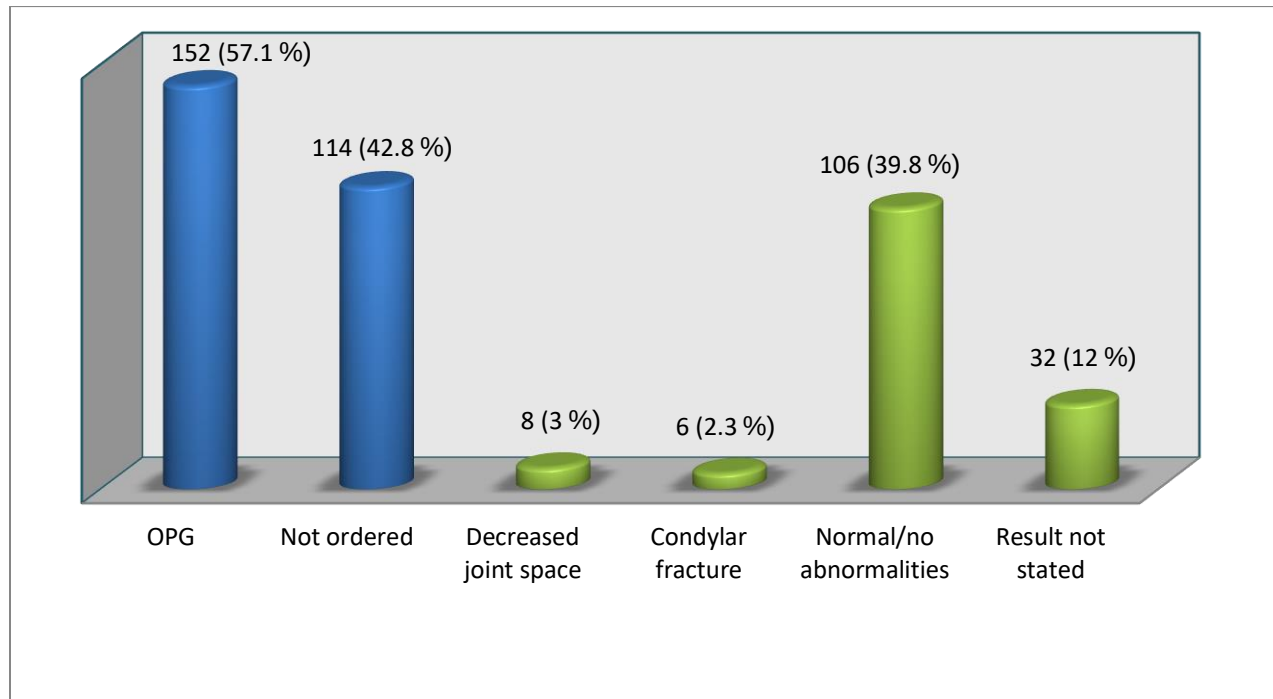


Figure 3Types of imaging and radiological findings of TMD patients

## 6.6. Pattern of different treatment modalities of TMD

As shown in the figure 6.4 below, the most commonly type of treatment was conservative treatment which was given for 241(90.6%) cases followed by open joint surgery 4(1.5%).

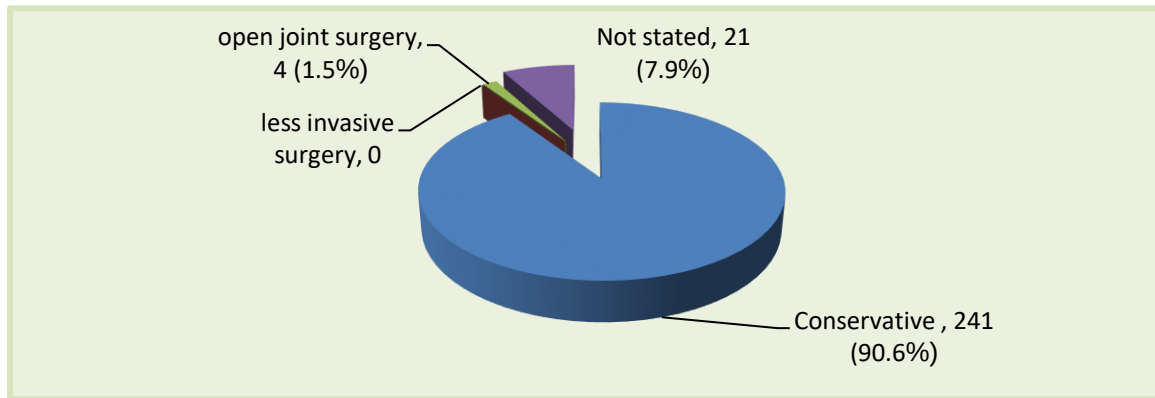


Figure 4 Types of treatment given for patients with TMD from 2011 to 2020 G.C

Table 5 outcome of conservative treatment

| Out come     | Frequency(N=241) | percentage |
|--------------|------------------|------------|
| improved     | 186              | 77.17%     |
| Not improved | 41               | 17.0%      |
| missing      | 14               | 5.8%       |

## 7. Discussion

Temporomandibular disorder is found to be one of most commonly occur following psychological problems, trauma, malocclusion and parafunctional habits. If TMDs are not properly managed, it can negatively influence both the psychosocial and functional activities of the patient. This retrospective study was conducted on a total of 266 medical records of patients with diagnosis of TMDs at SPHMMC, dental and maxillofacial surgery department from January 2011 to December 2020 G.C.

This study showed that TMDs were almost twice as common as females. This finding is in accordance with previous reported studies in Hungary, Brazil, Sweden and Finland (26, 27, 30 34).

Regarding age, several cross-sectional studies conducted in Australia have demonstrated that the overall prevalence of TMD is significantly higher in the 20-40-year age group when compared with other age group. This study also showed that there were a higher number of individuals affected by TMDs in the 21 to 30 age group similar with the literature (28).

Related studies agree that Causes of TMDs are complex and multifactorial. There are numerous factors that can contribute to TMDs. In this study, psychological factors were major cause of TMDs, similar to previous study conducted in Finland (33).

This study showed that 33(12.4%) cases of TMDs cause was malocclusion due to most likely multiple tooth loss in older patients and skeletal class three malocclusion were reported this is similar with previously conducted study in Romania they estimated that occlusal factors contributed about 10–20% to the total spectrum of etiological factors in TMDs (31). 33(12.4%) cases of trauma reported as one of TMDs cause due to accident/fall down and long time mouth opening during extraction (31 & 34). parafunctional habits 7(2.6%) which was long time chewing gum, bruxism and teeth clenching (31). There is statistically significant correlation between etiological factor and TMDs (p-value is 0.003).

As described in the table 3 above, females sign and symptoms of TMDs clearly showed more frequent than males. This corresponds to the results of previous study in Finland (34). Although a study conducted by Veera P Qvintus, Kirsi Sipilä et.al in Finland University reported

that TMJ clicking was found to be the most common clinical sign of TMDs followed by joint pain (34), however this study found that joint pain was most commonly reported sign and symptom while clicking sound were the second.

This study showed that among 266 medical records of patients, the diagnosis of TMD found to be the first occurring diagnosis. The second most frequently occurring TMD diagnosis reported were Myofascial Pain disorder and internal derangement of joint were the least diagnosis. However, previous study conducted by Toh, A.Q.J et.al, in Australia emphasized that disc displacement/Internal derangement of joint accounts (77.6%), followed by myalgia and arthralgia were the most prevalent type of TMDs (32).

Imaging can assist in the diagnosis of TMD in addition to history and physical examination findings. This result indicated that OPG imaging was most commonly used as the standard imaging technique for diagnosing TMDs. whereas 114(42.8%) cases were not ordered for imaging. This is because of not ease available or not affordable cost, TMD patients run away or prefer not to use it and of course additional imaging might not alter the initial management plan this is similar with previously conducted study in Seoul Korea (35).

As shown in the figure 4 the most commonly type of treatment was conservative treatment which was given for 241(90.6%) cases and from 241 cases 186(77.17%) were improved. This study findings directly compared with studies conducted by Vladimír Machoň, Jitka Levorová,et.al, at General University Hospital in, Czech Republic; emphasized that Conservative therapy for patients diagnosed with TMD is the basic treatment method and produces results comparable to mini-invasive and surgical therapy. Given that conservative therapy methods relating to joint structures are reversible, with minimal risk of structural damage, they are always the first treatment method selected. The goal of conservative therapy is to reduce pain (use of non steroidal anti-inflammatory drugs, soft food diet, application of heat, splint therapy) and subsequently improve opening of the mouth through physiotherapy and joint mobilization similar with US and Czech Republic literatures (11,12,13, 39).

## **8. Conclusion and Recommendations**

### **8.1. Conclusion**

According to this study, TMD is more common in females than in males, and it is more frequent in the younger age groups, particularly within the age group of 21 to 30 years.

The current findings imply that psychological factors, trauma, parafunctional habits, systemic disease and malocclusion were the causative factors of TMDs. However, we could not able to assess other associated factors due to the limitation in terms of availability or lack of clarity of data including the client's specific address and geographic location.

## 8.2. Recommendations

Based on the findings of the study, the following measures are very important to reduce the burden and improve the treatment outcome:

- Beyond the usual application of conservative treatment, a combination of noninvasive therapies including raising awareness for patients, counseling, stress managements, and self-care are recommended by concerned physicians.
- TMDs need further emphasis by SPHMMC, department of dental and maxillofacial surgery and other concerned departments to be ready by both professionals and equipments.
- Further prospective study is needed to understand the etiology and other associated factors of TMDs.

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## Annex I: Data collection Checklist

### St. Paul's Hospital Millennium Medical College Department of Dental and Maxillofacial Surgery, Addis Ababa, Ethiopia.

Data collection format for research on pattern of temporomandibular disorders among patient's presented at St Paul's Hospital Millennium Medical College Department of Dental and Maxillofacial Surgery during September 1, 2003 to August 30, 2012.

Date \_\_\_\_\_

Medical record number \_\_\_\_\_

| Ser. N <sup>o</sup> | Variables    | Proposed response           |                          |            | Coded response |
|---------------------|--------------|-----------------------------|--------------------------|------------|----------------|
| 1                   | Age in years |                             |                          |            |                |
| 2                   | Gender       | Male                        |                          |            |                |
|                     |              | Female                      |                          |            |                |
| 3                   | Address      | Rural                       |                          |            |                |
|                     |              | Urban                       |                          |            |                |
|                     |              | Not recorded                |                          |            |                |
| 4                   | Diagnosis    | Internal derangement of TMJ | Anterior dislocated jaw  | Unilateral |                |
|                     |              |                             |                          | Bilateral  |                |
|                     |              |                             | Posterior dislocated jaw | Unilateral |                |
|                     |              |                             |                          | Bilateral  |                |
|                     |              |                             | Displaced TMJ disc       | Unilateral |                |
|                     |              |                             |                          | Bilateral  |                |
|                     |              |                             | Others, specify          | Unilateral |                |
|                     |              |                             |                          | Bilateral  |                |
|                     |              | Degenerative joint disease  | Traumatic arthritis      | Unilateral |                |
|                     |              |                             |                          | Bilateral  |                |
|                     |              |                             | Osteoarthritis           | Unilateral |                |
|                     |              |                             |                          | Bilateral  |                |
|                     |              |                             | Inflammatory arthritis   | Unilateral |                |
|                     |              |                             |                          | Bilateral  |                |
|                     |              |                             | Infectious arthritis     | Unilateral |                |
|                     |              |                             |                          | Bilateral  |                |
|                     |              |                             | Metabolic arthritis      | Unilateral |                |
|                     |              |                             |                          | Bilateral  |                |
|                     |              |                             | Perforated TMJ disc      | Unilateral |                |
|                     |              |                             |                          | Bilateral  |                |
|                     |              |                             | Others, specify          | Unilateral |                |
|                     |              |                             |                          |            |                |

|    |                                 |                                    |                         |            |  |
|----|---------------------------------|------------------------------------|-------------------------|------------|--|
|    |                                 | Condylar bone fracture             | Intra capsular fracture | Bilateral  |  |
|    |                                 |                                    |                         | Unilateral |  |
|    |                                 |                                    | Extra capsular fracture | Bilateral  |  |
|    |                                 |                                    |                         | Unilateral |  |
|    |                                 |                                    | Others, specify         | Bilateral  |  |
|    |                                 |                                    |                         | Unilateral |  |
|    |                                 | TMJ adhesion                       | Bony adhesion           | Bilateral  |  |
|    |                                 |                                    |                         | Unilateral |  |
|    |                                 |                                    | Fibrous adhesion        | Bilateral  |  |
|    |                                 |                                    |                         | Unilateral |  |
|    |                                 |                                    | Others, specify         | Bilateral  |  |
|    |                                 |                                    |                         | Unilateral |  |
|    |                                 | Cystic lesion of TMJ               |                         |            |  |
|    |                                 | Benign tumors of TMJ               |                         |            |  |
|    |                                 | Malignant tumors of TMJ            |                         |            |  |
|    |                                 | Myofacial pain                     |                         |            |  |
|    |                                 | Others, specify                    |                         |            |  |
| 5  | Duration                        |                                    |                         |            |  |
| 6  | Etiology                        | 1. Trauma                          |                         |            |  |
|    |                                 | 2. Psychological problems          |                         |            |  |
|    |                                 | 3. Parafunctional habits           |                         |            |  |
|    |                                 | 4. Systemic disease                |                         |            |  |
|    |                                 | 5. Malocclusion                    |                         |            |  |
|    |                                 | 6. Others, specify                 |                         |            |  |
| 7  | Sign and symptoms               | 1. Clicking sound                  |                         |            |  |
|    |                                 | 2. Joint pain                      |                         |            |  |
|    |                                 | 3. Difficulty of mouth opening     |                         |            |  |
|    |                                 | 4. Difficulty of chewing           |                         |            |  |
|    |                                 | 5. Headache                        |                         |            |  |
|    |                                 | 6. Neck ache                       |                         |            |  |
|    |                                 | 7. Ear pain                        |                         |            |  |
|    |                                 | 8. Others, specify                 |                         |            |  |
| 8  | Types of imaging ordered        |                                    |                         |            |  |
| 9  | Radiological findings           | Loss of joint space                |                         |            |  |
|    |                                 | Condylar displacement              |                         |            |  |
|    |                                 | Degenerative changes               |                         |            |  |
|    |                                 | Others, specify                    |                         |            |  |
| 10 | Pattern of mandibular movements | 1. Deflect at maximum opening      |                         |            |  |
|    |                                 | 2. Difficulty of lateral excursion |                         |            |  |
|    |                                 | 3. Difficulty of protrusion        |                         |            |  |
|    |                                 | 4. Difficulty of retrusion         |                         |            |  |
|    |                                 | 5. Others, specify                 |                         |            |  |

|           |                               |                          |  |
|-----------|-------------------------------|--------------------------|--|
| <b>11</b> | Maximum inter incisal opening |                          |  |
| <b>12</b> | Types of treatment given      | 1. Conservative          |  |
|           |                               | 2. Less invasive surgery |  |
|           |                               | 3. Open joint surgery    |  |

## Annex-II: Dummy Tables

Table 1: Socio-demographic status of patient's with TMD from 2003 to 2012 E.C at SPHMMC Addis Ababa, Ethiopia

| Ser. N <sup>o</sup> | Information to be filled | Proposed response | Coded response |
|---------------------|--------------------------|-------------------|----------------|
| 1                   | Age in years             |                   |                |
| 2                   | Gender                   | Male              |                |
|                     |                          | Female            |                |
| 3                   | Address                  | Rural             |                |
|                     |                          | Urban             |                |
|                     |                          | Not recorded      |                |

Table 2: Diagnosis of patient's with TMD from 2003 to 2012 E.C at SPHMMC Addis Ababa, Ethiopia

|   |           |                               |                          |            |  |
|---|-----------|-------------------------------|--------------------------|------------|--|
| 4 | Diagnosis | Internal derangement of joint | Anterior dislocated jaw  | Unilateral |  |
|   |           |                               |                          | Bilateral  |  |
|   |           |                               | Posterior dislocated jaw | Unilateral |  |
|   |           |                               |                          | Bilateral  |  |
|   |           |                               | Displaced TMJ disc       | Unilateral |  |
|   |           | Degenerative joint disease    |                          | Bilateral  |  |
|   |           |                               | Others, specify          | Unilateral |  |
|   |           |                               |                          | Bilateral  |  |
|   |           |                               | Traumatic arthritis      | Unilateral |  |
|   |           |                               |                          | Bilateral  |  |
|   |           |                               | Osteoarthritis           | Unilateral |  |
|   |           |                               |                          | Bilateral  |  |
|   |           |                               | Inflammatory arthritis   | Unilateral |  |
|   |           |                               |                          | Bilateral  |  |
|   |           |                               | Infectious arthritis     | Unilateral |  |
|   |           |                               |                          | Bilateral  |  |
|   |           |                               | Metabolic arthritis      | Unilateral |  |
|   |           |                               |                          | Bilateral  |  |
|   |           |                               | Perforated TMJ disc      | Unilateral |  |
|   |           |                               |                          | Bilateral  |  |
|   |           |                               | Others, specify          | Unilateral |  |
|   |           |                               |                          | Bilateral  |  |
|   |           | Condylar bone fracture        | Intra capsular fracture  | Unilateral |  |
|   |           |                               |                          | Bilateral  |  |
|   |           |                               | Extra capsular fracture  | Unilateral |  |
|   |           |                               |                          | Bilateral  |  |
|   |           |                               | Others,                  | Unilateral |  |

|  |  |                         |                  |            |  |
|--|--|-------------------------|------------------|------------|--|
|  |  |                         | specify          | Bilateral  |  |
|  |  | TMJ adhesion            | Bony adhesion    | Unilateral |  |
|  |  |                         |                  | Bilateral  |  |
|  |  |                         | Fibrous adhesion | Unilateral |  |
|  |  |                         |                  | Bilateral  |  |
|  |  |                         | Others, specify  | Unilateral |  |
|  |  |                         |                  | Bilateral  |  |
|  |  | Cystic lesion of TMJ    |                  |            |  |
|  |  | Benign tumors of TMJ    |                  |            |  |
|  |  | Malignant tumors of TMJ |                  |            |  |
|  |  | Myofacial pain          |                  |            |  |
|  |  | Others, specify         |                  |            |  |

Table 3: Duration of TMD from 2003 to 2012 E.C at SPHMMC Addis Ababa, Ethiopia.

|          |                 |  |  |
|----------|-----------------|--|--|
| <b>5</b> | <b>Duration</b> |  |  |
|          |                 |  |  |

Table 4: etiology of TMD from 2003 to 2012 E.C at SPHMMC Addis Ababa, Ethiopia.

|          |                 |                           |  |
|----------|-----------------|---------------------------|--|
| <b>6</b> | <b>Etiology</b> | <b>1.Trauma</b>           |  |
|          |                 | 2. psychological problems |  |
|          |                 | 3. parafunctional habits  |  |
|          |                 | 4.systemic disease        |  |
|          |                 | 5.malocclusion            |  |
|          |                 | 6. others, specify        |  |

Table 5: sign and symptom of patient's with TMD from 2003 to 2012 E.C at SPHMMC Addis Ababa, Ethiopia.

|          |                          |                               |  |
|----------|--------------------------|-------------------------------|--|
| <b>7</b> | <b>Sign and symptoms</b> | <b>1.clicking sound</b>       |  |
|          |                          | 2. joint pain                 |  |
|          |                          | 3.difficulty of mouth opening |  |
|          |                          | 4.difficulty of chewing       |  |
|          |                          | 5.headache                    |  |
|          |                          | 6.neckache                    |  |
|          |                          | 7.Ear pain                    |  |
|          |                          | 8.others, specify             |  |

Table 6: types of imaging ordered for patient's with TMD from 2003 to 2012 E.C at SPHMMC Addis Ababa, Ethiopia.

|          |                                 |  |  |
|----------|---------------------------------|--|--|
| <b>8</b> | <b>types of imaging ordered</b> |  |  |
|----------|---------------------------------|--|--|

Table 7: radiological findings of patient's with TMD from 2003 to 2012 E.C at SPHMMC Addis Ababa, Ethiopia

|          |                              |                            |  |
|----------|------------------------------|----------------------------|--|
| <b>9</b> | <b>Radiological findings</b> | <b>Loss of joint space</b> |  |
|          |                              | Condylar displacement      |  |
|          |                              | Degenerative changes       |  |
|          |                              | Others, specify            |  |

Table 8: pattern of mandibular movement and inter incisal opening of patient's with TMD from 2003 to 2012 E.C at SPHMMC Addis Ababa, Ethiopia

|           |                                        |                                     |
|-----------|----------------------------------------|-------------------------------------|
| <b>10</b> | <b>Pattern of mandibular movements</b> | <b>1.deflect at maximum opening</b> |
|           |                                        | 2.difficulty of lateral excursion   |
|           |                                        | 3.difficulty of protrusion          |
|           |                                        | 4.difficulty of retrusion           |
|           |                                        | 5.others,specify                    |
| <b>11</b> | Maximum inter incisal opening          |                                     |

Table 9: types of treatment given for patient's with TMD from 2003 to 2012 E.C at SPHMMC Addis Ababa, Ethiopia.

|           |                                 |                         |
|-----------|---------------------------------|-------------------------|
| <b>12</b> | <b>Types of treatment given</b> | <b>1.Conservative</b>   |
|           |                                 | 2.less invasive surgery |
|           |                                 | 3.open joint surgery    |