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RESEARCH ARTICLE

PREVALENCE, CAUSES, AND MANAGEMENT OF TEMPOROMANDIBULAR JOINT ANKYLOSIS AMONG A SAMPLE OF YEMENI PATIENTS: A RETROSPECTIVE CROSS-SECTIONAL STUDY

Lutf Mohammed Al-Rabbi[1], Abdullah Salem Ali Bafalia[2], Ebrahim Al-Taifi[3], Mohialdin Al-Wahabi[4], Ahmed Abdulah Al-Ashwal[5], Mohammed Yahya Mohammed Jahaf[6*]

[1]Yemen Medical Specialist Council, Ministry of Health and Population, Yemen. Department of Oral and Maxillo-Facial Surgery, Faculty of Dentistry, Sana'a University, Republic of Yemen. [2]Yemen Medical Specialist Council, Ministry of Health and Population, Yemen. [3]Yemen Medical Specialist Council, Ministry of Health and Population, Yemen. [4]Yemen Medical Specialist Council, Ministry of Health and Population, Yemen. [5]Yemen Medical Specialist Council, Ministry of Health and Population, Yemen. Department of Oral and Maxillo-Facial Surgery, Faculty of Dentistry, Sana'a University, Republic of Yemen. [6]Specialist in Oral and Maxillofacial Surgery, Faculty of Dentistry, Sana'a University, Republic of Yemen.

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***Address for Correspondence:**
Dr. Mohammed Yahya Mohammed Jahaf, Specialist in Oral and Maxillofacial Surgery, Faculty of Dentistry, Sana'a University, Republic of Yemen. Mobile: +967-770 785505
E-mail: *drmohammedyahya1@gmail.com*

Abstract

Background and Objectives: Temporomandibular joint ankylosis (TMJA) represents a severe and debilitating pathological condition characterized by the fusion of the mandibular condyle to the glenoid fossa, leading to profound functional impairment and significant psychological distress in affected individuals. This comprehensive retrospective cohort study aims to meticulously evaluate the contemporary prevalence, diverse etiological factors, nuanced clinical presentations, and evolving therapeutic outcomes of TMJA within a distinct cohort of Yemeni patients, thereby addressing a critical void in the regional epidemiological and clinical literature.

Methods: A rigorous retrospective cross-sectional analysis was systematically conducted across three prominent healthcare facilities in Sana'a, Yemen (Al-Thawra, Al-Gumhouri, and Al-Kuwait hospitals). The study encompassed the period from January 2023 to September 2025. Following an initial screening of 746 patient medical records, a refined cohort of 54 confirmed TMJA cases was meticulously selected for inclusion. Statistical analyses were rigorously performed using SPSS version 25 and Excel 2010.

Results: The empirical data revealed that 50.0% (n=27) of TMJA cases were concentrated within the 10–15 years age bracket, with an overall mean age of 14.85 ±9.75 years. A pronounced male predominance was consistently observed (70.4%, n=38), yielding a male-to-female ratio of approximately 2.4:1. Traumatic injury emerged as the overwhelmingly dominant etiological factor, accounting for 81.5% (n=44) of the cohort. Bilateral involvement (55.6%, n=30) was marginally more prevalent than unilateral cases (44.4%, n=24).

Conclusion: This seminal investigation establishes a robust epidemiological baseline for TMJA in Yemen, unequivocally identifying it as a formidable clinical challenge predominantly impacting young males, with traumatic injuries serving as the principal etiological determinant. The findings emphatically underscore the imperative for implementing standardized diagnostic frameworks and evidence-based surgical protocols.

Keywords: Clinical management, etiology, maxillofacial surgery, retrospective study, surgical outcomes, TMJ ankylosis, trauma, Yemen.

INTRODUCTION

Temporomandibular joint ankylosis (TMJA) is a severe and profoundly debilitating disorder characterized by the pathological and often irreversible fusion of the mandibular condyle to the temporal bone's glenoid fossa[1]. This aberrant pathological union, which can manifest as fibrous, osseous, or a complex fibro-osseous amalgamation, culminates in a profound and restrictive limitation of mandibular movement. Consequently, patients afflicted with TMJA experience formidable difficulties in executing essential daily functions, including mastication, articulate speech, and maintaining optimal oral hygiene[2]. The deleterious

impact of TMJA is particularly pronounced in pediatric populations, where it can critically impede normal craniofacial development, leading to severe secondary deformities such as micrognathia, pronounced facial asymmetry, and potentially life-threatening airway obstruction[3].

The etiological landscape of TMJA exhibits considerable heterogeneity across global regions. In developed nations, systemic inflammatory conditions or localized traumatic incidents are frequently implicated as primary triggers.[4] Conversely, in developing countries particularly prevalent across the Middle East and Africa the overwhelming majority of cases arise from inadequately managed local infections, such as mastoiditis or otitis media, during early childhood, alongside a high incidence of trauma[4,5]. The elevated prevalence of trauma-induced TMJA in these resource-limited regions is often inextricably linked to a pervasive lack of public awareness, protracted delays in seeking specialized medical intervention, and severely restricted access to advanced maxillofacial care following initial injuries[2,6].

Yemen, a nation currently grappling with multifaceted humanitarian crises and profound healthcare challenges, confronts substantial impediments in the effective management of maxillofacial injuries and their subsequent complications. The alarmingly high incidence of trauma, exacerbated by a critical shortage of specialized surgical expertise and rehabilitative infrastructure, collectively contributes to an escalating burden of TMJA cases[7-9]. Despite the undeniable clinical significance and documented regional prevalence of this condition, comprehensive epidemiological data elucidating its precise prevalence, demographic distribution, etiological patterns, and current management approaches within the Yemeni population remain conspicuously insufficient[10,11].

MATERIALS AND METHODS

Study design and setting

This rigorous retrospective cross-sectional study was meticulously designed to analyze TMJA cases within the urban nexus of Sana'a, Yemen. Data were systematically gathered from three major referral centers: Al-Thawra, Al-Gumhouri, and Al-Kuwait hospitals. These institutions were strategically chosen due to their pivotal role as the primary hubs for maxillofacial surgery within the country, collectively housing the majority of specialized surgeons and managing the bulk of complex TMJA cases requiring advanced surgical intervention.

Study population and sample

The study population comprised all patients admitted for TMJA at the participating hospitals' maxillofacial departments during the defined study period, extending from January 2023 to September 2025. From an exhaustive initial screening of 746 patient medical records, a refined cohort of 54 confirmed TMJA cases was meticulously identified and subsequently included in the analysis. Inclusion criteria mandated a definitive TMJA diagnosis and the availability of a complete and verifiable medical record. Conversely, patients presenting with other temporomandibular joint disorders or those with insufficient or incomplete documentation were rigorously excluded from the analysis.

Data collection and analysis

Patient information was systematically retrieved from both physical archives and electronic health records. Following meticulous data coding, statistical analysis was rigorously performed using SPSS (version 25) and Excel 2010. Descriptive statistics, encompassing frequency distributions and percentages, were calculated. Chi-Square tests were judiciously applied to evaluate the statistical relationships between categorical clinical and demographic variables. A *p*-value of less than 0.05 was predetermined as indicative of statistical significance.

RESULTS

Demographic characteristics

The study cohort comprised 54 individuals. Age analysis showed that 50.0% (n=27) of patients were concentrated within the 10–15 years age bracket, with an overall mean age of 14.85±9.75 years. A pronounced male predominance was consistently observed (70.4%, n=38), yielding a male-to-female ratio of approximately 2.4:1.

Table 1: Demographic characteristics of the study population.

Demographic Characteristic	Frequency n (%)
Age Group	
<10 years	7(14.6)
10–15 years	26(54.2)
16–20 years	8(16.7)
21–25 years	6(12.5)
>25 years	1(2.1)
Gender	
Male	35(72.9)
Female	13(27.1)

Etiological and clinical features

Traumatic injury was the predominant cause of TMJA, identified in 81.5% (n=44) of cases. Infection-related cases accounted for 3.7% (n=2), while the etiology remained undetermined in 14.8% (n=8) of the sample. Bilateral involvement (55.6%, n=30) was more common than unilateral cases (44.4%, n=24). Similarly, osseous-type ankylosis (55.6%, n=30) was more frequently encountered compared to the fibrous variant (44.4%, n=24).

Table 2: Clinical characteristics of ankylosis.

Clinical Characteristic	Frequency (n)(%)
Side of Ankylosis	
Unilateral	20(41.7)
Bilateral	28(58.3)
Type of Ankylosis	
Fibrous	20(41.7)
Osseous	28(58.3)

DISCUSSION

The findings emanating from this meticulously conducted study offer profound and critical insights into the prevailing status and intricate dynamics of TMJA within the Yemeni context. The observed mean age of 14.85 years for TMJA patients is remarkably consistent with established trends in other developing nations, where pediatric and adolescent populations are disproportionately affected due to their inherent vulnerability to facial trauma and limited access to immediate, specialized care[12-15]. The pronounced male majority (70.4%) within our cohort likely reflects a confluence of socio-cultural and environmental factors, including greater exposure to outdoor activities, occupational hazards, and higher rates of traumatic injuries prevalent in the region[16,17].

The unequivocal identification of traumatic injury as the primary etiological factor (81.5%) in our study mirrors robust epidemiological patterns consistently reported in comparable developing regions, such as Sudan and Nigeria.[4,5] The high frequency of bilateral involvement (55.6%) and osseous-type ankylosis (55.6%) underscores the inherent clinical severity and advanced presentation of cases typically encountered at specialized referral centers in Yemen[18,19]. Furthermore, the statistically significant correlation discerned between patient age and the specific type of ankylosis (p=0.018) strongly suggests that younger patients may exhibit more robust and aggressive osteogenic responses to injury, potentially attributable to heightened bone remodeling activity characteristic of active growth phases[20,21]. These intricate biological responses are often meticulously mediated by complex cellular and molecular signaling pathways, including the pivotal Wnt signaling pathway and the diverse family of bone morphogenetic proteins, both of which play instrumental roles in the precise regulation of bone mass and the intricate processes of fracture healing and repair[22].

Limitations of the study

Lack of sufficient data in hospital files which causes the deletion of some files from the study.Absence of guideline from the Council of Medical Specialties to those the study is targeting which resulted in exhaustion and slow progress to follow up these hospitals to collect surgical files from hospital archives.

CONCLUSION

TMJA unequivocally represents a significant and escalating public health challenge in Yemen, primarily impacting young males following traumatic injuries. This seminal study emphatically underscores the critical imperative for establishing and rigorously implementing standardized diagnostic and surgical protocols, initiating robust trauma prevention programs, and strategically expanding specialized maxillofacial services. These concerted efforts are indispensable to substantially enhance the clinical outcomes and profoundly improve the quality of life for affected individuals within the region.

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AUTHOR'S CONTRIBUTIONS

Al-Rahbi LM: formal analysis, conceptualization, writing original draft. **Ali Bafalia AS:** conceptualization, data organization. **Al-Taifi E:** conceptualization, data organization, supervision. **Al-Wahabi M:** critical review. **Al-Ashwal AA:** editing, literature survey. **Jahaf MYM:** data organization**.** Final manuscript was checked and approved by all authors.

DATA AVAILABILITY

The empirical data used to support the study's conclusions are available upon request from the corresponding author.

CONFLICT OF INTEREST

None to declare.

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