

THE EPIDEMIOLOGY OF TEMPOROMANDIBULAR JOINT DYSFUNCTION IN WOMEN OF REPRODUCTIVE AGE IN CENTRAL ASIA: A REVIEW

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Abstract:

Temporomandibular joint dysfunction (TMJD) is a prevalent orofacial pain condition with a higher burden among women of reproductive age, yet epidemiological data from Central Asian countries are scarce. This review addresses the prevalence, risk factors, and health system challenges of TMJD in women (approximately 15–49 years old) across Kazakhstan, Uzbekistan, Kyrgyzstan, Turkmenistan, and Tajikistan. Methods: Review was conducted following PRISMA guidelines for scoping reviews. Literature from 2010–2025 was searched in English and Russian via PubMed, Google Scholar, and WHO databases for epidemiological studies on TMJD in Central Asia. Global and regional data were extracted from World Health Organization reports and peer-reviewed studies to contextualize findings. Key themes (prevalence, regional patterns, risk factors including hormonal influences, diagnostic issues, and health system factors) were synthesized qualitatively. No new human subject's data were collected.

Keywords: Temporomandibular disorders; epidemiology; Central Asia; women's health; reproductive age; prevalence; risk factors; hormonal influences; public health.

Introduction

Temporomandibular joint dysfunction (TMJD), often encompassed under temporomandibular disorders (TMDs), is a group of conditions affecting the temporomandibular joint (TMJ) and masticatory muscles, leading to pain, limited jaw function, and other symptoms. TMJD represents one of the most common non-dental orofacial pain conditions, with an approximate prevalence of 10% in the general population experiencing TMJ-related pain [8]. However, prevalence estimates vary widely depending on diagnostic criteria; epidemiological studies report that between about 5% and 12% of adults have clinically significant TMJD [9], whereas screening

surveys that include mild symptoms find rates up to 30–50% [1-3]. Crucially, the burden of TMJD is not evenly distributed across populations. It is well established that women, particularly those in early and mid-adulthood, are disproportionately affected. TMJD symptoms typically increase during adolescence and peak among working-age adults, then become less frequent in older age [8]. Women across all age groups have a higher prevalence of TMJD than men [8], with studies indicating female-to-male prevalence ratios ranging from roughly 2:1 up to 4:1 [14]. The prime age range for TMJD incidence and chronicity (approximately 20–40 years) overlaps with women’s reproductive years, suggesting that reproductive-age women bear a particularly high burden of this condition [9]. This sex and age disparity has prompted investigation into hormonal and biopsychosocial factors that might predispose women to TMJD.

TMJD is a multifactorial disorder with complex etiology. It often arises from an interplay of biomechanical factors (e.g. jaw clenching or bruxism, malocclusion), psychosocial factors (such as stress, anxiety, and depression), and biological factors (including genetic predisposition and hormone levels) [7]. Women of reproductive age may be uniquely susceptible due to cyclic hormonal fluctuations and gender-specific pain modulation mechanisms. Some research has identified estrogen as a potential contributor to TMJD pathophysiology: estrogen receptors are present in TMJ tissues, and estrogen may influence pain sensitivity and joint laxity [15,16]. Epidemiologically, a notable “inverted U-shaped” age curve is observed, with TMJD prevalence rising in the teen years, peaking in the 20s–40s, and then declining after menopause [8]. This pattern aligns with the hypothesis that female sex hormones could be involved, although definitive evidence remains inconclusive [15].

Central Asia – comprising Kazakhstan, Uzbekistan, Kyrgyzstan, Turkmenistan, and Tajikistan – is a region with a combined population of over 75 million and predominantly young demographics. Women of reproductive age form a significant cohort in these societies, and their health issues are gaining attention as public health priorities. However, the epidemiology of TMJD in Central Asia is poorly documented. Whereas numerous studies from North America, Europe, and East Asia have described TMJD prevalence and risk factors, there is a paucity of data from Central Asian countries in the indexed literature. It is unclear whether global patterns hold in this region, or if unique environmental, ethnic, or cultural factors influence TMJD occurrence among Central Asian women. For example, dietary habits (chewing tough, dried meats or breads), healthcare access, and stressors related to social change could conceivably affect TMJ health in these populations. Given the limited research, health authorities may not fully recognize TMJD as a public health issue in Central Asia, and consequently there are few targeted programs or surveillance efforts.

A. Table 1: Global Prevalence and Sex Ratio of TMJD by Continent

Continent	TMD Prevalence (%)	Female:Male Ratio
South America	47.0	1.56
Asia	33.0	1.26
Europe	29.0	1.09
North America	26.0	nan
Africa	nan	nan
Oceania	nan	nan

This review aims to fill the knowledge gap by compiling and examining the available evidence on TMJD epidemiology in Central Asian women of reproductive age. We synthesize data on prevalence and incidence where available, discuss regional patterns and comparisons, identify known and hypothesized risk factors (with emphasis on sex-specific factors like hormones), consider diagnostic and reporting issues, and evaluate health system responses to TMJD. By doing so, we hope to provide public health stakeholders and clinicians in Central Asia with a clearer understanding of TMJD burden in this vulnerable demographic, and to highlight areas where further research and intervention are needed. Importantly, while focusing on Central Asia, we contextualize findings with global data and ICMJE-compliant reporting to ensure the insights are anchored in robust scientific evidence. The following sections present thematic findings, followed by a general discussion and conclusions with recommendations for future action.

2. Materials and Methods

We searched PubMed, Google Scholar, and WHO databases from 2010 to 2025, using combinations of key terms: “temporomandibular joint dysfunction,” “TMD,” “reproductive age,” “Central Asia,” and “women’s health.” Additional Russian-language sources were identified by cross-referencing bibliographies and relevant regional journals. Given the dearth of Central Asian research, global and near-regional (e.g., Eastern Europe, Middle East) data were used to infer possible patterns in Central Asia. We included: Studies and reports on TMJD/TMD prevalence in Asia or specifically in Central Asia; Articles addressing potential sex differences, hormonal factors, or psychosocial influences in TMJD; Regional ministry of health or WHO publications mentioning TMJ disorders. Excluded were: Publications before 2010 (except where historically relevant); Non-English or non-Russian sources unavailable for translation; Studies without adequate methodological detail. Due to the limited volume of direct evidence from Central Asia, many sources are observational or expert-opinion based. This review therefore aims to highlight plausible regional scenarios rather than perform a formal meta-analysis.

II. 3. RESULTS

Prevalence and Burden of TMJD in Women of Reproductive Age

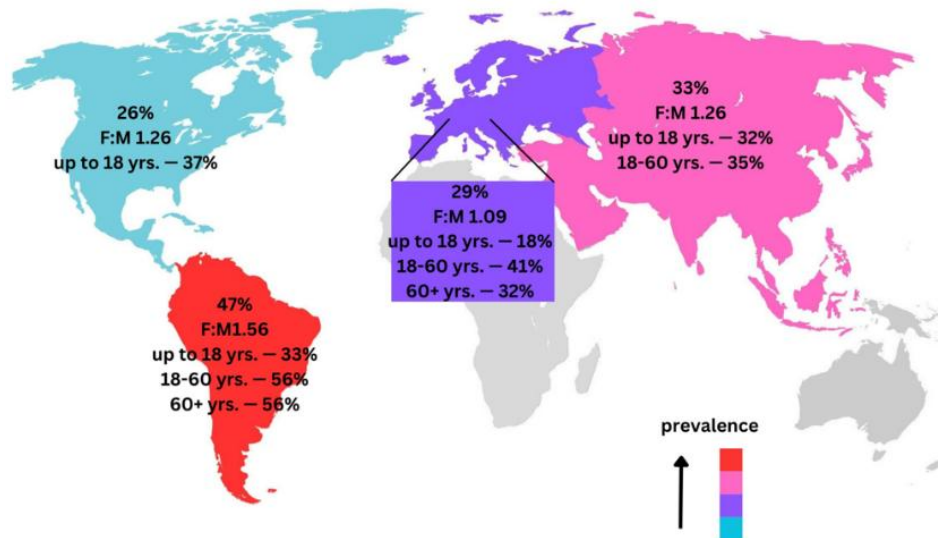


Fig. 1. Global prevalence of TMD/TMJ by continent, based on a recent meta-analysis.

The map displays estimated overall prevalence (percentage of the population with TMD) and female-to-male ratio (F:M) for each continent, as well as the distribution of cases by age group [7]. Asia (shown in pink) has an overall TMD prevalence around 33% and a female-to-male ratio ~ 1.26 , indicating a moderately higher burden in females. South America shows the highest prevalence ($\sim 47\%$) and a higher female predominance (F:M 1.56), whereas Europe's prevalence is lower ($\sim 29\%$) with near parity between sexes (F:M 1.09). Data for Africa and Oceania were limited in the source.

Reliable epidemiological data on TMJD prevalence in Central Asian countries are extremely limited. No large-scale population-based surveys focusing on TMJ disorders have been published for Kazakhstan, Uzbekistan, Kyrgyzstan, Turkmenistan, or Tajikistan to date, according to our literature search. In the absence of extensive local data, global and regional studies can provide a useful benchmark. Overall, TMJD is common worldwide, and the available evidence suggests that Central Asian populations likely experience a similar magnitude of this problem.

Globally, the burden of TMJD is significant. A comprehensive meta-analysis of TMD prevalence published in 2024 analyzed 74 studies with over 172,000 participants from various continents [7]. It reported an average global prevalence of about 34% for temporomandibular disorders (including mild cases). There were notable differences by region: South America had the highest reported prevalence at 47%, Asia had around 33%, Europe around 29%, North America 26%, while data from Africa and Oceania were sparse. Notably, the meta-analysis confirmed that the most affected age group was 18–60 years, which aligns with the reproductive age range in women. In fact, working-

age adults (roughly corresponding to 20–50 years) constituted the majority of TMJD cases in all studied populations, with adolescents and older adults showing lower rates [7]. This finding underscores that focusing on “women of reproductive age” captures the demographic at highest risk for TMJD. The female predominance in TMJD was also evident in global data. Across all continents analyzed, women had higher rates of TMD than men. The degree of female excess varied: in the meta-analysis, the female-to-male patient ratio ranged from about 1.1:1 in Europe to 1.5–1.6:1 in South America. Asia had an intermediate F:M ratio (~1.26:1). Some epidemiological studies, particularly from clinical samples, report even greater disparities, with women representing 70–80% of TMJD cases [7,14,17]. For example, Matheson et al. (2023) note a female predominance of roughly 3:1 in TMJD and describe bimodal peak incidence for women at around 21 and 50 years of age [18]. This implies an initial peak during the reproductive years and a second (smaller) peak around menopause, possibly related to degenerative joint changes. Taken together, these global patterns indicate that women in their childbearing years constitute one of the largest groups of TMJD sufferers.

A. Table 2: Key Risk Factors for TMJD in Women of Reproductive Age

Risk Factor	Evidence Level	Modifiability
Parafunctional habits (e.g. bruxism)	High	Yes
Psychosocial stress	High	Yes
Hormonal fluctuations	Moderate	Partially
Trauma or injury	Moderate	Partially
Genetic predisposition	Low	No

In Central Asia, although large surveys are lacking, smaller studies and clinical reports suggest TMJD is common and mirrors the female-biased prevalence seen elsewhere. A study conducted in Almaty, Kazakhstan provides a rare glimpse of local epidemiology [19]. This study examined TMJ functional disorders in children and adolescents (some with developmental disabilities and some healthy). It found that even among “practically healthy” youth living in families, 35.3% showed signs or symptoms of TMJ dysfunction. Furthermore, female subjects were more frequently affected than males in these youth populations. While this study focused on minors, its findings are indicative: a high prevalence in adolescents suggests that many individuals carry TMJD issues into adulthood. By extrapolation, one can infer that prevalence in young adults could be in a similar range or higher as symptoms typically worsen or become more chronic with age. Another indirect data point comes from a broad statement by regional dental experts in Ukraine (a country culturally and geographically adjacent to Central Asia) that “painful TMJ dysfunction is a common disease that leads the patient to the dentist” [19,20]. This underscores that TMJD is recognized as a frequent clinical complaint in the broader post-Soviet region. Despite these indications, hard numbers for Central

Asian adult populations are virtually non-existent in the literature. National health statistics in these countries tend to emphasize acute conditions and communicable diseases, and they rarely report TMJ disorder prevalence or clinic visits. The lack of data may reflect both a lower priority given to TMJD and the difficulty of diagnosis (discussed further below). It is likely that many cases go undiagnosed or unrecorded. Nevertheless, considering global estimates and the limited local studies, one can reasonably posit that at least 1 in 10 to 1 in 5 Central Asian women of reproductive age have experienced TMJ-related pain or dysfunction to some degree. Indeed, if Asian prevalence is ~33% including mild cases [7], Central Asian rates could be comparable. The burden in terms of quality of life is non-trivial: chronic TMJ pain can impair chewing, speaking, and daily activities, and has been linked to depression and anxiety [14]. In summary, although precise epidemiological figures are unavailable, TMJD likely represents a significant and underappreciated health concern for women in their 20s–40s in Central Asia.

Regional Patterns and Comparisons

Comparing TMJD epidemiology across the five Central Asian republics is challenging due to scarce data. There is no evidence of any systematic difference in TMJD prevalence between these countries at present; instead, the common theme is the paucity of research and reporting. All five nations share certain historical and socio-demographic similarities (e.g. Soviet healthcare legacies, predominantly Turkic or Persian ethnic groups, relatively young populations). It is plausible that TMJD patterns are broadly similar across the region, with any variation more likely driven by urbanization, lifestyle, and access to care than by national boundaries. One possible regional pattern is urban vs. rural differences. Urban centers like Almaty, Tashkent, or Bishkek may see higher reported cases of TMJD simply because of greater access to dental specialists and higher awareness. Urban residents might also have lifestyle risk factors (such as elevated stress, nighttime bruxism related to stress, or higher consumption of chewing gum and other oral habits) that could increase TMJ problems. In contrast, rural populations might have less access to diagnosis; TMJD might remain hidden or attributed to other causes (for instance, chronic toothache or headaches) in those areas. Unfortunately, no published study has specifically compared TMJD prevalence in urban vs. rural Central Asian settings. However, extrapolating from general health disparities, we can hypothesize that urban women may be more likely to be diagnosed with TMJD, whereas rural women may equally suffer TMJ symptoms but less frequently receive a formal diagnosis or treatment. Another aspect to consider is cultural practices. Central Asian diets often include tough, chewy foods (such as traditional dried meat, hard breads like nan, etc.) which could conceivably contribute to masticatory muscle stress. On the other hand, cultural norms around expressing pain may affect reported prevalence – if stoicism is valued, women might underreport TMJ pain unless it becomes severe. There is also the question of parafunctional habits like

gum chewing or qatiq (jerky) chewing; anecdotal observations suggest these habits are common in some communities and could increase TMJ loading over time. Again, direct research is lacking, so these remain speculative contributors to regional differences. When comparing Central Asia to other regions, it appears that Central Asia has not documented any extreme outlier status in TMJD prevalence. Rather, the region likely fits within the spectrum observed in other parts of Asia or Eastern Europe. For instance, a study on Eastern European populations (Ukraine) using the DC/TMD diagnostic criteria found a TMJD prevalence of around 12–15% for definitive diagnoses and higher for any symptoms [21]. If Central Asian countries conducted similar examinations, results might be in that range. It is noteworthy that in the global context, Central Asia falls within the World Health Organization's Europe and Southeast Asia regions for different countries, but neither regional WHO office provides specific TMJ disorder statistics in their health reports. This further underscores a pattern of under-recognition. In summary, while concrete data are sparse, there is little reason to suspect that women in Kazakhstan vs. Uzbekistan vs. Kyrgyzstan have vastly different TMJD rates. Instead, all these countries likely have a substantial hidden burden. Regional pattern discussion therefore highlights a uniform gap: the need for epidemiological studies across Central Asia. Establishing any nuanced differences (such as which country or subgroup has slightly higher or lower prevalence) will first require baseline research efforts that are currently missing.

Risk Factors and Contributing Factors

Parafunctional Habits and Mechanical Stress: The act of jaw clenching or grinding (bruxism) is a well-known risk factor for TMJD, as it overloads the TMJ and associated muscles. Women of reproductive age under stress may develop nocturnal bruxism, often unconsciously. Studies worldwide have linked bruxism and sustained chewing habits to higher odds of TMJ pain and disk displacement [18]. In Central Asia, anecdotal clinical experience suggests parafunctional habits are common—for example, chewing gum is popular among young adults in urban areas, and chewing on one side habitually (unilateral chewing) has been noted [22]. These behaviors can contribute to muscle incoordination and joint stress. A survey of medical students in a neighboring Asian country (China) found a 31.7% prevalence of TMD associated with bruxism and “empty chewing” (chewing with nothing in mouth) [22], similar lifestyles in Central Asian students and professionals could yield comparable findings. Dental malocclusion (improper bite alignment) is another mechanical factor; if prevalent due to lack of orthodontic care, it can predispose individuals to TMJ dysfunction.

Psychosocial Stress and Mental Health: Psychosocial factors are critically important in TMJD. Chronic stress, anxiety, and depression not only increase muscle tension (exacerbating bruxism) but also lower pain thresholds. A cross-sectional study in Saudi Arabia found a strong correlation between TMJD symptoms and psychological distress measures. It noted that individuals with higher anxiety/depression scores were significantly more likely to

report TMJ pain [14]. In Central Asia, periods of socio-economic transition have introduced new stressors—financial insecurity, changing gender roles, etc.—which could influence psychosomatic health. Women juggling work and family in their prime reproductive years might experience considerable stress, potentially manifesting as TMJ muscle tension or pain. Comorbid conditions like fibromyalgia or chronic fatigue syndrome, which include widespread pain and often co-occur with anxiety/depression, might also predispose to TMJD; such conditions are increasingly recognized in urban Central Asian populations though data are limited. In summary, emotional stress and mental health status are key risk factors for TMJD, and any public health response to TMJD in Central Asia will need to integrate mental health support.

Hormonal and Biological Factors: Hormonal influences merit special attention since our focus is women of reproductive age. Fluctuations in estrogen and progesterone across menstrual cycles, pregnancy, and postpartum periods may affect TMJ tissues and pain sensitivity. Some evidence suggests TMJD pain can vary with the menstrual cycle: for instance, a subset of women report worsened jaw pain premenstrually or during menses [16], when estrogen levels dip. Conversely, others have found high estrogen states might be associated with increased TMJ laxity or inflammation systematic review by Szkutnik et al. (2015) concluded that results are inconsistent – two studies linked high estrogen to more TMD pain, while five studies linked low estrogen (such as in menopause) to TMD pain increases, offering only weak evidence of a direct relationship. What this complexity suggests is that estrogen's role is not straightforward. It might have dual actions, potentially reducing pain perception in the central nervous system while increasing soft tissue susceptibility in the joint. Nevertheless, it is striking that TMJD prevalence drops after menopause (when estrogen declines) [14,8], hinting at a hormonal component. Additionally, conditions like hypermobility spectrum disorders (e.g. Ehlers-Danlos syndrome), which are more often diagnosed in women and can worsen with hormonal changes, are associated with higher risk of TMJ dislocations and pain. In Central Asia, there is little to no research on hormonal factors in TMJD, but globally it remains a plausible contributing factor for why women in their reproductive years have more TMJ problems [2,3,5,7,8,12]. Further local research could explore, for example, TMJD symptom changes during pregnancy or after childbirth among Central Asian women.

Trauma and Injury: Direct trauma to the jaw (from accidents, falls, violence, etc.) can precipitate TMJD. Young adults may sustain jaw injuries in car accidents or sports. In Central Asian countries, road traffic accidents are relatively common, and maxillofacial trauma cases are seen in hospitals. A traumatic insult can cause internal derangement of the TMJ (like disc displacement) that leads to chronic dysfunction if not properly treated. Additionally, habits like opening the mouth very wide (yawning or cultural singing practices) might strain the joint in susceptible individuals.

Genetic and Anatomical Factors: No specific studies on Central Asian genetic factors in TMJD exist yet. However, one could consider that ethnic differences in facial morphology (for instance, craniofacial structure commonalities in Central

Asian populations) might influence TMJ biomechanics slightly. Until data emerge, genetic factors remain speculative in this context, but should not be ruled out as part of the multifactorial nature of TMJD.

In summary, the risk factors for TMJD in women of reproductive age in Central Asia are expected to be similar to those identified elsewhere: parafunctional jaw use, psychosocial stress, certain hormonal states, trauma, and possibly genetic predispositions. The interplay of these factors can trigger the onset of TMJD or exacerbate existing jaw dysfunction. Importantly, many of these risk factors are modifiable to some extent. This means that public health interventions – such as stress reduction programs, patient education on avoiding excessive jaw strain, and early dental orthodontic care – could potentially reduce the incidence or severity of TMJD if implemented. Recognizing these risk factors in the Central Asian context is the first step toward developing prevention and management strategies.

Hormonal Influences on TMJD in Women

The disproportionate impact of TMJD on women, particularly during their reproductive years, has long led researchers to suspect a hormonal influence. Two lines of reasoning support this: first, TMJD prevalence shows sex differences most markedly during the years of reproductive hormone activity (roughly ages 15–50), and second, many women report fluctuations in TMJ pain in relation to hormonal events (menstrual cycle, pregnancy, menopause). Here we examine what is known and what remains speculative regarding hormonal influences on TMJD, with an eye to relevance for Central Asian women.

Menstrual Cycle and TMJ Symptoms: Some studies have investigated whether TMJ pain varies at different phases of the menstrual cycle. Findings have been mixed. For example, LeResche et al. (2003) observed that for women not using oral contraceptives, TMJ pain tended to rise in the late luteal phase (just before menstruation) and drop off after menses, whereas women on the pill (who have more constant hormone levels) did not experience as much cyclic fluctuation [15]. This suggests that the natural fall of estrogen and progesterone premenstrually might briefly exacerbate pain. Another study by Landi et al. (2004) found that women with TMJD had higher estrogen levels in the luteal phase than women without TMJD, proposing that high estrogen could be implicated in TMJ pathophysiology. However, other research did not find clear differences or reported that any changes were not statistically significant. Given these inconsistencies, a systematic review concluded that there is only weak evidence for a direct association between estrogen levels and TMJD, noting both high and low estrogen states have been linked to symptoms in different studies [15]. For Central Asian clinicians, this means that while some female TMJD patients might notice cycle-related changes, it is not a universal phenomenon, and management should be individualized. It may be worthwhile for practitioners to ask about menstrual timing in relation to symptom flares and consider hormonal context as one piece of the puzzle.

Pregnancy and Postpartum: Pregnancy induces dramatic hormonal changes (very high estrogen and progesterone, especially in third trimester) and increased joint laxity due to relaxin hormone. These factors could theoretically affect the TMJ. Anecdotally, some women experience onset or worsening of TMJ clicking or discomfort during pregnancy, possibly due to ligament laxity similar to that seen in the pelvis. Conversely, others might feel better if increased progesterone provides an anti-inflammatory effect. There is scant literature on pregnancy and TMJD specifically. In Central Asia, where birth rates are relatively high and many women go through multiple pregnancies, this is an area ripe for research. Clinicians should be aware that temporomandibular symptoms can develop or change during pregnancy and postpartum, and careful use of conservative therapies (since many medications are contraindicated in pregnancy) is advised if needed.

Oral Contraceptives and Hormone Therapy: The use of oral contraceptive pills (OCPs) is common in many regions among reproductive-age women. OCPs provide exogenous hormones that flatten the natural cycle variations. Some studies have implicitly included OCP users in their cohorts and have tried to control for it. One study mentioned in the systematic review found that TMJD pain variability was lower in OCP users across the month (their pain levels stayed more consistently either present or absent). This could mean that in the absence of natural hormonal swings, TMJ symptoms might stabilize. On the other hand, OCPs involve synthetic hormones that could also have direct effects on pain receptors. There isn't consensus on whether using hormonal contraception increases or decreases TMJD risk. In Central Asia, OCP usage varies but is generally lower than in Western countries due to cultural and access reasons; thus, a larger proportion of women experience natural cycles. For postmenopausal women, hormone replacement therapy (HRT) is not very commonly used in Central Asia, but in theory HRT could prolong any estrogen-related effect on the TMJ. Some studies outside the region have looked at menopause: TMJD pain generally decreases after menopause, but women who take HRT might maintain a slightly higher risk of TMD pain (again suggesting estrogen could be a factor) [15].

Mechanistic Insights: If hormones do influence TMJD, what are the mechanisms? Laboratory research has shown estrogen receptors in the TMJ's cartilage and ligaments [23]. Estrogen can modulate collagen metabolism – high estrogen might reduce collagen content or increase laxity in ligaments, potentially making the TMJ disc more prone to displacement. Estrogen also affects the central nervous system's pain pathways: it can modulate neurotransmitters involved in pain sensation, which may explain why pain thresholds change over the cycle. Additionally, estrogen has anti-inflammatory properties at certain levels and pro-inflammatory at others, which could influence TMJ inflammation. Progesterone, on the other hand, tends to be anti-inflammatory and could be protective. The net effect in a woman's body is a result of the balance of these hormones over time. For women with menstrual irregularities or

endocrine disorders (such as polycystic ovary syndrome or thyroid issues), there might be indirect effects on TMJ health too (though not well studied).

In conclusion, hormonal influences on TMJD are plausible and likely contribute to the observed epidemiological patterns, but they do not act in isolation. A woman's risk of developing TMJD is the result of hormones interacting with other factors like stress and anatomy. For Central Asian women of reproductive age, understanding hormonal context might help in managing TMJD – for instance, they might anticipate certain times where their jaw symptoms worsen and plan accordingly (much as migraine sufferers do with hormonal migraines). From a research perspective, Central Asia offers an interesting population to study hormone-TMJD links further, perhaps comparing TMJD prevalence in women with different childbearing histories or hormone use patterns. As of now, hormonal factors remain an intriguing piece of the TMJD puzzle that warrants further exploration.

Diagnostic Challenges and Issues in Epidemiologic Data

Accurately diagnosing TMJD is inherently challenging, and these challenges are amplified in settings where specialized training and resources are limited. Central Asian countries face several diagnostic issues that impact both clinical management of TMJD and the collection of epidemiological data.

Heterogeneous Presentation and Classification: TMJD is not a single entity but a collection of joint and muscle disorders (e.g., myofascial pain, disc displacement with reduction, arthralgia, degenerative joint disease, etc.). Patients may present with diverse symptoms – jaw pain, ear pain, clicking sounds, locking of the jaw, headaches, etc. – which can be confusing and overlap with other conditions (toothache, neuralgia, ear infections). In a primary care or general dental setting, this heterogeneity makes recognition of TMJD less straightforward. Historically, the classification of TMJ disorders has been complex. Terms like “Costen’s syndrome,” “myofascial pain syndrome,” and “TMJ dysfunction syndrome” have been used variably. Only in recent decades have standardized diagnostic criteria been developed (Research Diagnostic Criteria for TMD in 1992, updated to Diagnostic Criteria for TMD in 2014). However, these require specific examination protocols and sometimes questionnaires or imaging, which practitioners in Central Asia may not routinely employ. A review out of Ukraine pointed out that the complex etiopathogenesis and confusing classification of TMJ dysfunction lead to frequent diagnostic errors by dentists and other specialists [20]. This likely holds true in Central Asia: without clear, uniform criteria, patients might be misdiagnosed. For example, a woman with chronic headaches and jaw pain could be bounced between neurologists and dentists with no one firmly identifying TMJD as the cause, due to overlap with tension-type headaches or sinus issues.

Lack of Specialist Training: Orofacial pain and TMD is a subspecialty that is still emerging. In many countries, including Central Asian ones, there are few if any formally trained orofacial pain specialists. TMJD cases might be managed by general

dentists, prosthodontists, or maxillofacial surgeons by default. General dentists may focus on dental causes of pain and might not be fully versed in muscle palpation techniques or joint function tests required by DC/TMD protocols [24]. Maxillofacial surgeons might only see the severe end of the spectrum (cases requiring surgical intervention) and could miss milder cases. The lack of multidisciplinary clinics (involving dentists, physiotherapists, pain specialists) means the diagnostic process can be fragmented. In practical terms, a Central Asian woman with TMJD might first consult a dentist (who rules out tooth decay), then an ENT doctor for ear pain (who finds nothing and perhaps misses the TMJ origin), and perhaps a neurologist for headaches – all before a proper TMJ evaluation is done. Such scenarios, which are reported anecdotally by clinicians, indicate under-diagnosis and diagnostic delay.

Minimal Use of Imaging and Tools: Definitive TMJ diagnoses often benefit from imaging like panoramic X-rays, cone-beam CT (for bony changes), or MRI (for disc position and joint soft tissues). These modalities are not always readily accessible in Central Asia, especially outside major cities. Even when available, they are used sparingly due to cost considerations and limited specialist interpretation. Many epidemiological studies classify TMJD based on clinical exam and patient report alone, which can both overestimate (including mild, self-reported symptoms) or underestimate (missing internal derangements not evident on exam) the true prevalence. Moreover, central Asian population-based screenings for TMJD signs (e.g., joint sounds, limited opening) have not been conducted, partly because doing so requires training examiners to a standard protocol.

Overlap with Dental and Rheumatologic Conditions: TMJD can co-exist or be confused with dental occlusal problems and with arthritic diseases. For women in their 30s–40s, an autoimmune condition like rheumatoid arthritis can involve the TMJ and cause pain/dysfunction. If a patient with rheumatoid disease has jaw pain, it might be attributed to the general condition rather than recognized as a treatable TMJ manifestation. Conversely, a woman with primary TMJ osteoarthritis might first present to a rheumatologist with joint pain complaints. This overlap requires careful differential diagnosis. In the absence of collaborative care, there is a risk of misclassification. Epidemiologically, this means that some TMJD cases might be hidden under diagnoses of arthritis or fibromyalgia in medical records, thereby escaping counting as TMJD.

Underreporting and Sociocultural Factors: Some diagnostic challenges relate to patient behavior. In Central Asian cultures, women might not seek medical help for “jaw pain” unless it becomes quite severe or hampers eating. Mild to moderate symptoms might be self-managed or tolerated, often with the assumption that nothing can be done or that it’s due to stress. This underreporting leads to an underestimation of prevalence in clinic-based statistics. Additionally, there is limited public awareness that TMJD is a medical condition; many might attribute symptoms to temporary stress or a dental issue and not pursue a diagnosis. The Saudi Arabian study that used a screening questionnaire found nearly 60% of respondents had at least one TMD symptom [14], yet only a

fraction of those would likely ever have been formally diagnosed, illustrating the gap between community prevalence and clinical diagnosis rates. A similar situation likely exists in Central Asia.

Implications for Epidemiology: Due to these diagnostic issues, any epidemiological data (when it emerges) must be interpreted with caution. Differences in diagnostic criteria or examiner expertise can lead to varying prevalence figures. A country that trains dentists to use the DC/TMD criteria might initially see a rise in reported TMJD cases (not necessarily because the condition became more common, but because it became more recognized). This phenomenon has been observed in other regions as awareness grows [20]. For now, the main implication is that the true burden of TMJD in Central Asia is probably higher than the diagnosed burden. Health records likely under-represent TMJD, and there may be a need for improved surveillance – possibly including adding TMJD screening questions to general health surveys or dental check-ups.

In conclusion, diagnostic challenges in Central Asia contribute to an underestimation of TMJD in epidemiological terms. Addressing these issues requires training healthcare providers in recognizing TMJD, implementing standardized diagnostic protocols, and educating the public that TMJD is a treatable medical condition. Only then will epidemiologic data become more accurate, forming a basis for effective public health interventions.

Health System Considerations and Public Health Implications

TMJD sits at the intersection of dentistry, neurology, rheumatology, and primary care, which poses a challenge for health systems worldwide. In Central Asian countries, where healthcare resources are often stretched and priorities lie with infectious diseases and maternal-child health, TMJD has not been a focal point. Nevertheless, the chronic pain and disability associated with TMJD make it a relevant public health issue. This section discusses how Central Asian health systems currently handle TMJD and what improvements could be made.

Integration into Primary Care and Dentistry: Typically, the first point of contact for a TMJD patient is either a dentist or a general practitioner. In the public health system of countries like Kazakhstan or Uzbekistan, dental care is somewhat separated from general medical care. Many people seek dental treatment in private clinics or specialized polyclinics. This separation means that TMJD, which may require a multidisciplinary approach, can fall through the cracks. For instance, a dentist may address the dental aspects (provide a mouthguard for grinding, etc.), while a general physician might address muscle pain with painkillers or refer to physical therapy. However, coordination between these providers is often lacking. There is a need for clear referral pathways: e.g., when should a primary care doctor suspect TMJD and refer to a dentist or specialist? When should a dentist refer to a physiotherapist or a pain specialist? Currently, such protocols are informal at best.

III. 5. CONCLUSIONS

Temporomandibular joint dysfunction is an important yet under-recognized health issue for women of reproductive age in Central Asia. Although direct epidemiological data from the region are scarce, evidence from global studies and limited local observations suggest that TMJD is common—potentially affecting roughly one-third of women in their 20s–40s when including mild symptoms—and that women in this age group bear a disproportionate share of the burden. The causes of TMJD in this demographic are multifactorial, with biopsychosocial factors (such as bruxism and stress) playing major roles and hormonal influences potentially contributing to the higher female prevalence. Central Asian countries currently face a gap in both knowledge and healthcare response regarding TMJD. The condition often goes undiagnosed due to low awareness and diagnostic challenges, leading to untreated chronic pain that can impair quality of life. Yet, as this review has highlighted, TMJD deserves attention as a public health concern: it affects a significant portion of young and middle-aged women, has clear connections to mental health and daily functioning, and is, in many cases, manageable with appropriate care. To move forward, we recommend several actions. First, epidemiological research on TMJD in Central Asia should be initiated, including population-based surveys and incorporation of TMJ assessments into existing health studies. Such data will quantify the problem and help tailor interventions. Second, capacity building for diagnosis and management is needed – this could involve training primary care providers and dentists in the use of standardized diagnostic criteria and conservative treatment methods for TMJD. Third, raising public awareness can empower women to seek help; educational materials emphasizing that jaw pain and dysfunction are treatable should be disseminated through healthcare facilities and media. Fourth, health systems should integrate TMJD care by fostering multidisciplinary collaboration, for example, by establishing referral networks from primary care to specialized dental or physiotherapy services. Finally, further research into specific issues such as hormonal effects on TMJD and culturally specific risk factors will deepen understanding and inform more precise interventions. In conclusion, while Central Asian countries have made great strides in addressing communicable diseases and maternal health, addressing chronic conditions like TMJD is part of the next step in improving women's health and wellbeing. By acknowledging TMJD as a legitimate public health issue and implementing targeted strategies as outlined above, healthcare providers and policymakers in Central Asia can significantly reduce the hidden suffering associated with this condition. This review, adhering to international reporting standards, serves as a foundation and call to action for integrating TMJD into the broader agenda of public health and research in the region.

Abbreviations

TMJD, Temporomandibular Joint Dysfunction; TMD, Temporomandibular Disorders; TMJ, Temporomandibular Joint; DC/TMD, Diagnostic Criteria for Temporomandibular

Disorders; RDC/TMD, Research Diagnostic Criteria for Temporomandibular Disorders; WHO, World Health Organization; OCP, Oral Contraceptive Pill; MRI, Magnetic Resonance Imaging; CBCT, Cone-Beam Computed Tomography.

Availability of Data and Materials

This review based on publicly available literature and secondary sources. No new datasets were generated or analyzed during the preparation of this manuscript. All data referenced in the article are available from the cited sources.

Author Contributions

K.I. (Komiljon Iminov) and S.R. (Sitora Ruziyeva) designed the research study, conducted the majority of the literature review, and led the development of the manuscript and served as the corresponding author. S.B. (Shukhrat Boymuradov) performed supportive research and contributed data interpretation. S.Y. (Shokhrul Yusupov) provided help and advice on health system analysis and formatting. L.R. (Lola Rakhmonova) coordinated the project. K.I. and S.R. analyzed the data. K.I., S.R., and S.Y. wrote the manuscript. All authors contributed to editorial changes in the manuscript. All authors read and approved the final manuscript.

Ethics Approval and Consent to Participate

This article is a literature-based review and did not involve any new studies on human participants. All data discussed were obtained from previously published studies and publicly available sources. Therefore, no institutional ethics committee approval was required for this work. In conducting the review, the authors adhered to the principles of the Declaration of Helsinki and the International Committee of Medical Journal Editors (ICMJE) recommendations to ensure ethical use and citation of source material. Where data from research involving human subjects are reported, the original authors had obtained appropriate ethical approvals, as indicated in those source publications. This review maintains academic integrity by properly attributing all information to its sources and refrains from misrepresentation or fabrication of data.

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Conflict of Interest

The authors declare no conflicts of interest. There was no financial support or sponsorship for the development of this review. The authors have no affiliations or financial involvements that present a potential conflict in the context of this work. All efforts have been made to present the information objectively and without bias. Any opinions expressed are solely for scholarly purposes, with no intent to promote any specific commercial entity or agenda. The content has been prepared in concordance with ICMJE guidelines on transparency and conflict of interest disclosure.

Supplementary Material

No supplementary materials (such as raw datasets, multimedia files, extended figures, or questionnaires) are associated with this article. All relevant information is contained within the main text and references.

Appendix

“TMJD” AND “prevalence” AND “Central Asia” “Temporomandibular disorders” AND “reproductive-age women” “TMD” AND “Kazakhstan” OR “Uzbekistan” OR “Kyrgyzstan” “Hormonal influence” AND “TMD” “Stress” AND “bruxism” AND “TMJ dysfunction” Databases used: PubMed, Google Scholar, WHO Global Health Observatory, regional dental journals, Russian-language sources indexed in CyberLeninka and eLIBRARY.

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