

Impact of pregnancy on temporomandibular joint dysfunction

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Abstract

Background: Temporomandibular disorder (TMD) do not always come directly from the dysfunction of the joints themselves. Women are significantly more likely than men to report symptoms of TMJ area dysfunction and are also more likely to seek professional treatment.

Aims: This study aimed to evaluate the impact of pregnancy on TMD.

Material and methods: A total of 231 women at various stages of pregnancy participated in the study. They were asked to complete a questionnaire designed for this research. The questionnaire was posted on Facebook groups dedicated to pregnant women. The results of the study were processed by assuming a significance level of $p < 0.05$.

Results: TMD was observed in the studied group of pregnant women. A large percentage of women reported harmful parafunctions with lip and cheek overbite being the most common at 55.8% and teeth clenching at 40.3%. A statistically significant relationship was observed between the trimester of pregnancy and the severity of TMJ area pain symptoms, which decreased with subsequent trimesters. The largest percentage of surveyed women reported an increase in symptoms during pregnancy. An association between the presence of cervical spine pain and the presence of masticatory dysfunction was also demonstrated.

Conclusion: There is a significant correlation between the trimester of pregnancy and the severity of TMJ area pain, which decreases in later trimesters ($p = 0.02$). There was also a correlation between the coexistence of statistically significant TMD and the occurrence of cervical spine pain ($p = 0.01$).

Key words

temporomandibular joints, dysfunctions, pregnancy, hormonal changes, parafunctions

Introduction

Temporomandibular joint (TMJ) is a paired condylar joint. It forms the connection between the mandible and the temporal bone, and the articular surfaces are covered with fibrocartilage. With the mandibular molar, the two joints, right and left, are functionally coupled. The shape of the mandibular fossa surface depends on the degree of stress on the joint. In children, it is flat and begins to deepen with the emergence of permanent teeth.

Temporomandibular disorder (TMD) develops when there is a disturbance in the functioning and interaction of individual elements of the stomatognathic system, such as joints, muscles, nerves, or teeth. However, it is important to remember that TMD do not always originate directly from them, although in many cases their dysfunction accompanies the underlying condition. Women are four times more likely than men to report symptoms of TMD while being three times more likely to seek professional treatment.

In women, the TMJs contain estrogen receptors that affect the metabolism of the surrounding tissues, resulting in increased flexibility and relaxation of the ligaments [1-6].

Aims

The objective of this study was to investigate the impact of pregnancy on the occurrence of TMD and to answer posed research questions: (1) Are

TMJs dysfunctional in pregnant women? (2) Does pregnancy affect changes in TMJs ailments? (3) Does the pregnancy stage affect TMJ pain ailments? (4) Are TMJ dysfunctions accompanied by depressive disorders? (5) Are TMD accompanied by headaches?

Material and methods

The participants were women with first or subsequent pregnancy. The age distribution is shown in the table (**Table 1**).

After considering all the inclusion and exclusion criteria, 231 women participated in the study, among whom 32.5% declared that this was their first pregnancy, while 67.5% were in the process of subsequent pregnancy. The highest percentage of respondents were women in the second trimester of pregnancy (48.9%), while the lowest were women in the first trimester (13.4%). Details are presented on the graph (**Figure 1**).

Participants were asked to declare the presence of parafunctions that are common causes of TMJs dysfunctions. The majority, that is about 56%, reported that they occasionally bite their lips and cheeks, while 14.3% of the respondents reported none of the parafunctions (**Figure 2**). A separate question was asked about the presence of bruxism, that is, habitual clenching and grinding of teeth (**Figure 3**), and symptoms in the form of squeaking or tinnitus (**Figure 4**).

Table 1. Characteristics of the study group by age.

Variable	M	Me	Min	Max	SD
Age	27.94	27.0	19	50	4.83

Abbreviations: M – mean; Me – median, Min – minimum, Max – maximum, SD – standard deviation.

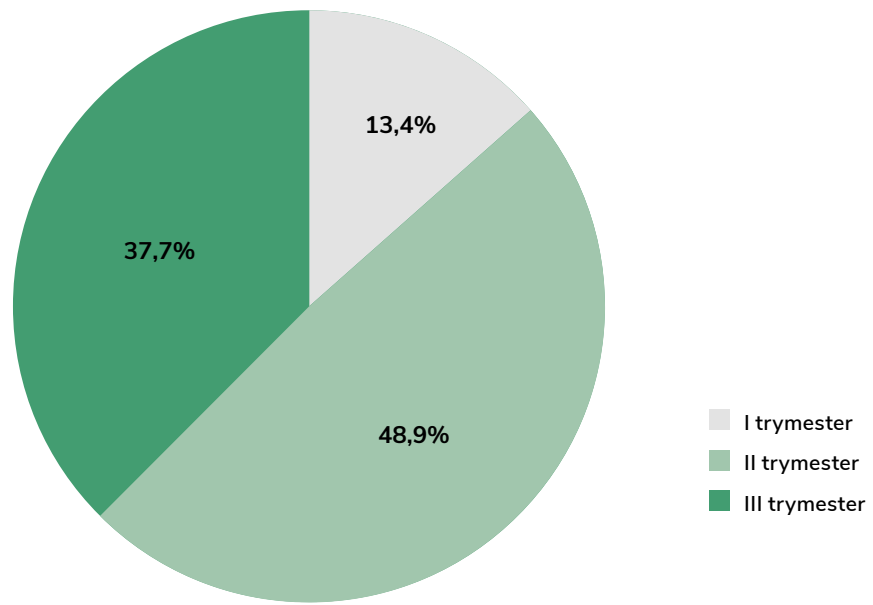


Figure 1. Distribution of respondents by trimester of pregnancy.

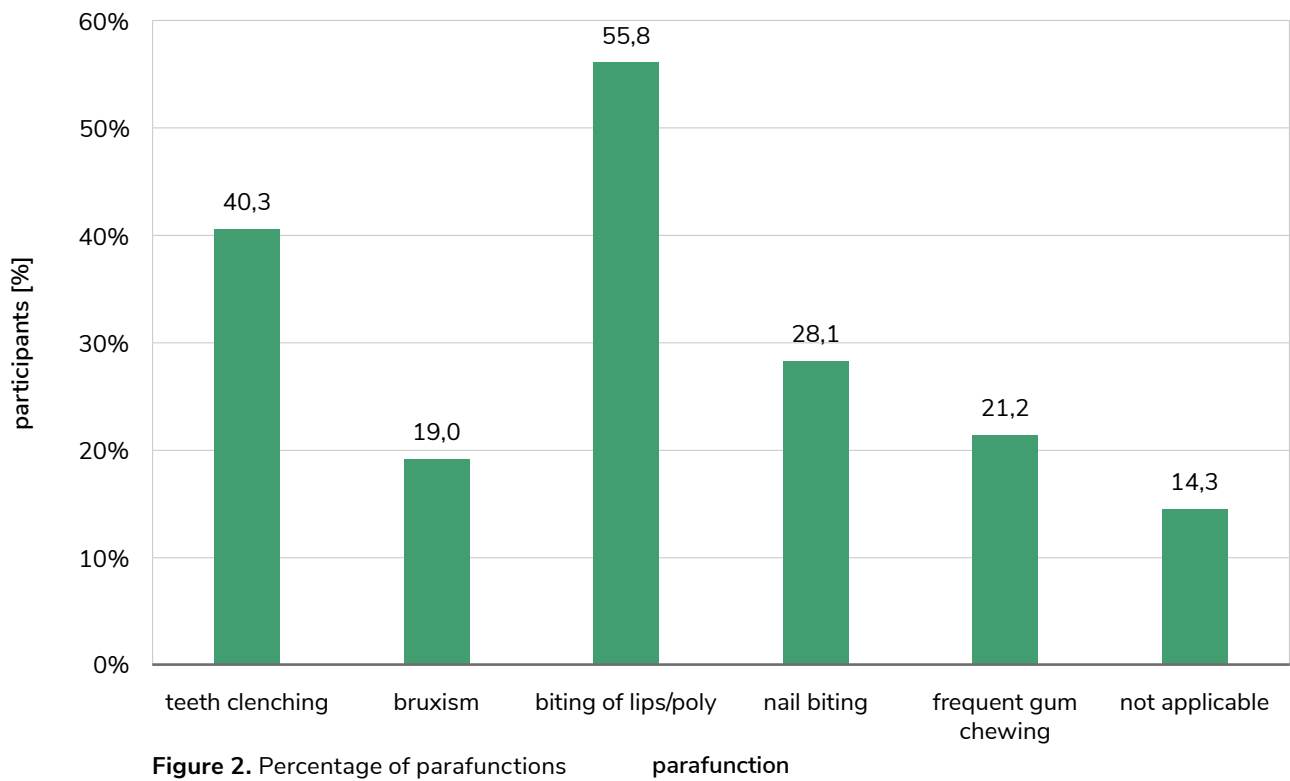


Figure 2. Percentage of parafunctions in the study group.

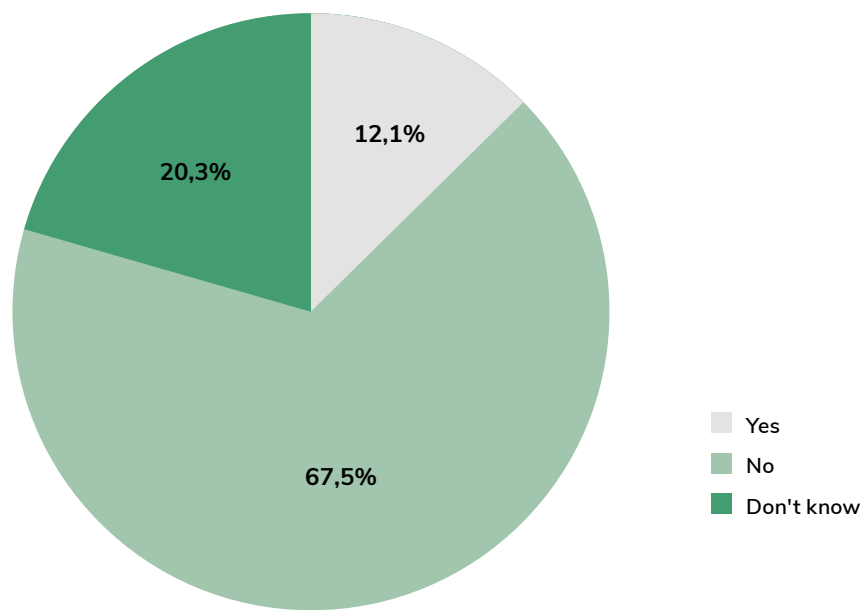


Figure 3. Prevalence of bruxism in the study group.

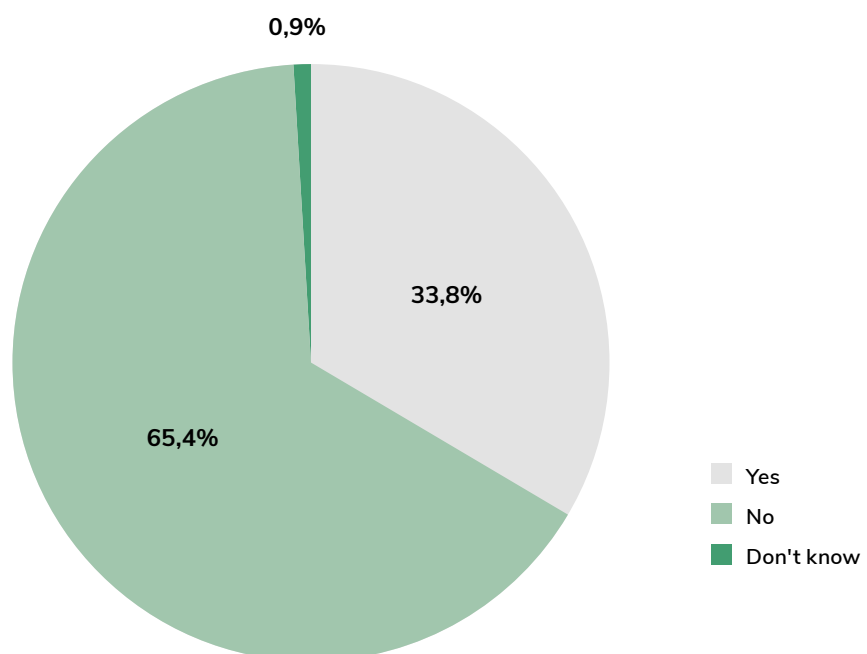


Figure 4. Prevalence of tinnitus in the study group.

A self-administered anonymous questionnaire was used in the study. The questionnaire consisted of 32 closed-ended questions, both single and multiple choice. The following inclusion and exclusion criteria were adopted: Inclusion Criteria: female, over 18 years of age, and pregnant. Exclusion Criteria: under 18 years of age, lactation period, or no pregnancy.

In the first part of the questionnaire, the subjects were asked about the occurrence of factors that may affect the onset of TMJs dysfunction. They were asked to answer questions concerning mental health and wellness during pregnancy and comorbidities that predispose to TMJs dysfunction. In the next section, the questions examined the presence of pain in the facial and head area. The respondents were asked to characterize their ailments, mark the place of their most frequent occurrence, and determine their severity using a 10-point Visual Analogue Scale (VAS). The last section of the questionnaire related directly to TMJs. Participants answered questions including characteristic symptoms of joint dysfunction, such as crackling, blocked range of motion, or tinnitus, as well as the presence of parafunction.

The questionnaire was distributed through the social networking site, Facebook, and posted on groups for pregnant women and young mothers. For each group, the survey was sent out again after approximately 4 months. Data was analyzed using Statistica and Excel from Microsoft Office Professional Plus 2013. Pearson's Chi square and McNemar's Chi square tests were used for the analysis.

Results

The presence of TMD both before and during pregnancy was reported by approximately 47% of the respondents (**Figure 5**). In both instances, TMJ clicking was most frequently reported (37.7% before pregnancy and 38.1% during pregnancy) and TMJ pain was least frequently reported (8.7% before pregnancy and 10% during pregnancy).

TMJ crackling was experienced more often by 2 percentage points during pregnancy than before pregnancy. In contrast, TMJ blocking were declared by 3 percentage points more women before pregnancy than during pregnancy. No differences were found in the occurrence of TMD before and during pregnancy.

More than 23% of the subjects reported that their TMJs symptoms increased during pregnancy, while 12% of the women reported a decrease (**Figure 6**), 60% of the examined group could not determine the severity of the ailments.

The relationship between the occurrence of pain in the TMJ region and the trimester of pregnancy (**Figure 7**) was analyzed. Pearson's Chi square test ($p=0.02175$) confirmed that the pregnancy stage influences the occurrence of TMD. Among women who reported pain, the highest percentage were in the first trimester of pregnancy (38.7%). In the following two trimesters, the perceived discomfort was much lower, at 31.9% for the second trimester and 17.2% for the third trimester. The next stage was to examine whether the presence of depressive disorders affects the occurrence of TMD (**Figure 8**). However, there was no relationship between these characteristics ($p=0.08$).

The respondents were asked about the frequency of headaches, and their comorbidity with TMJs dysfunction symptoms was further analyzed (**Figure 9**). Among the women who had frequent headaches, the majority also had TMD (40.5%). In the group that suffered from headaches infrequently, a higher percentage were women who also did not experience TMD (55.7%). In the absence of headaches, 13.8% reported the occurrence of TMD, while 18.4% reported no such symptoms. Statistical analysis showed no association between the presence of headache and TMD.

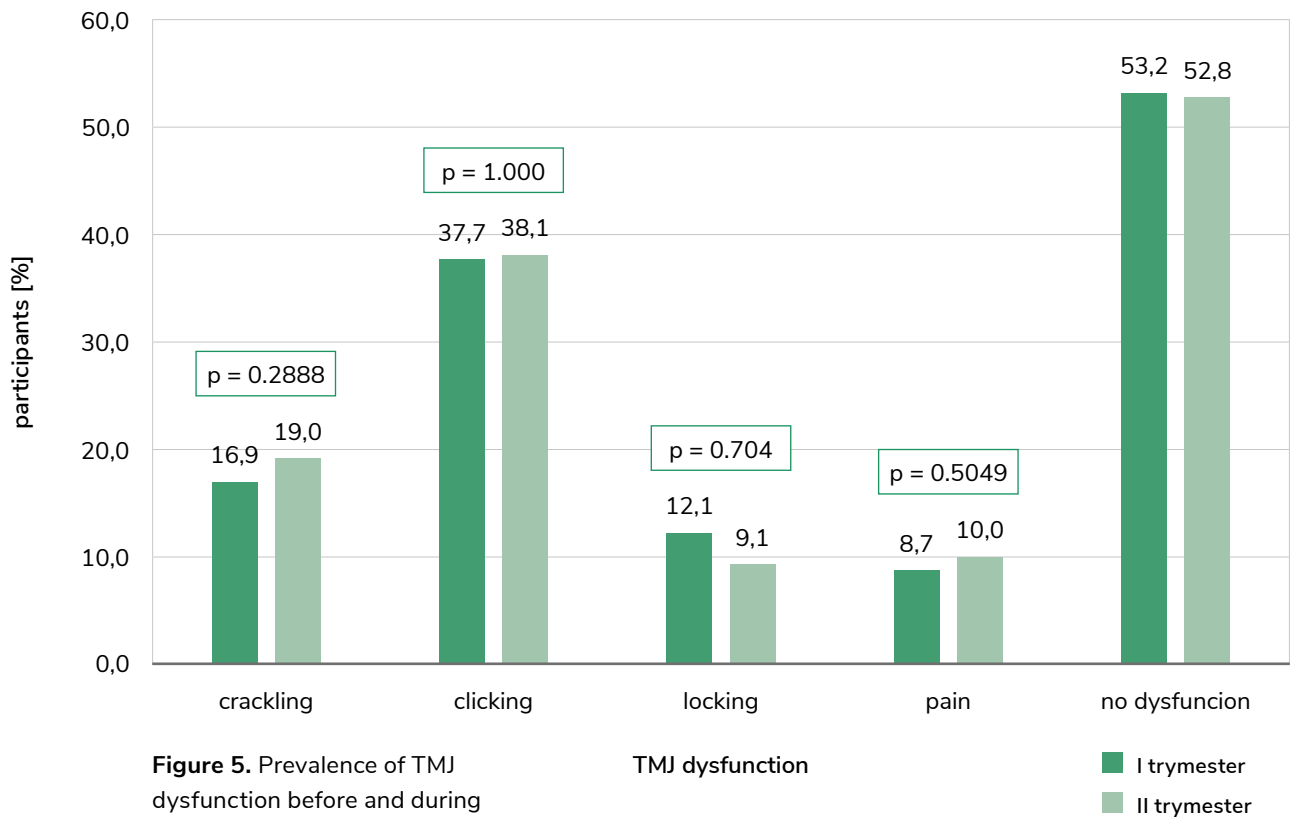


Figure 5. Prevalence of TMJ dysfunction before and during pregnancy.

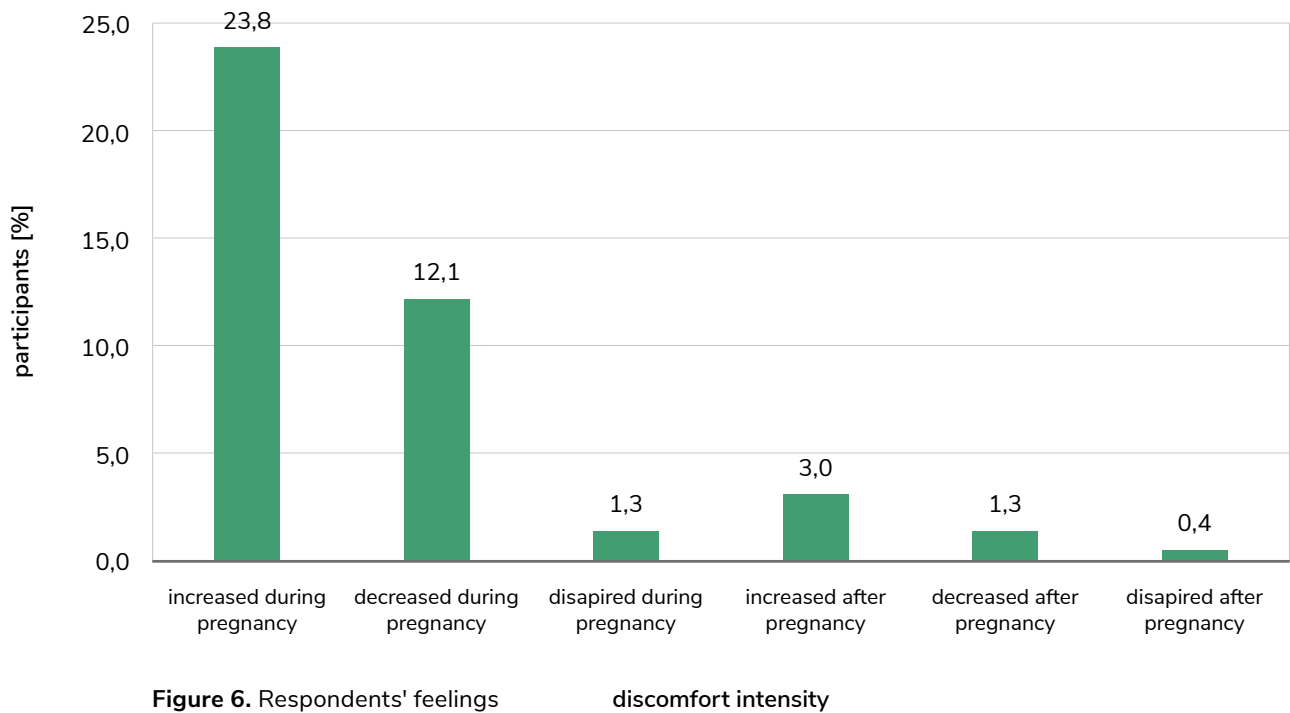


Figure 6. Respondents' feelings about the TMJ discomfort intensity during and after pregnancy.

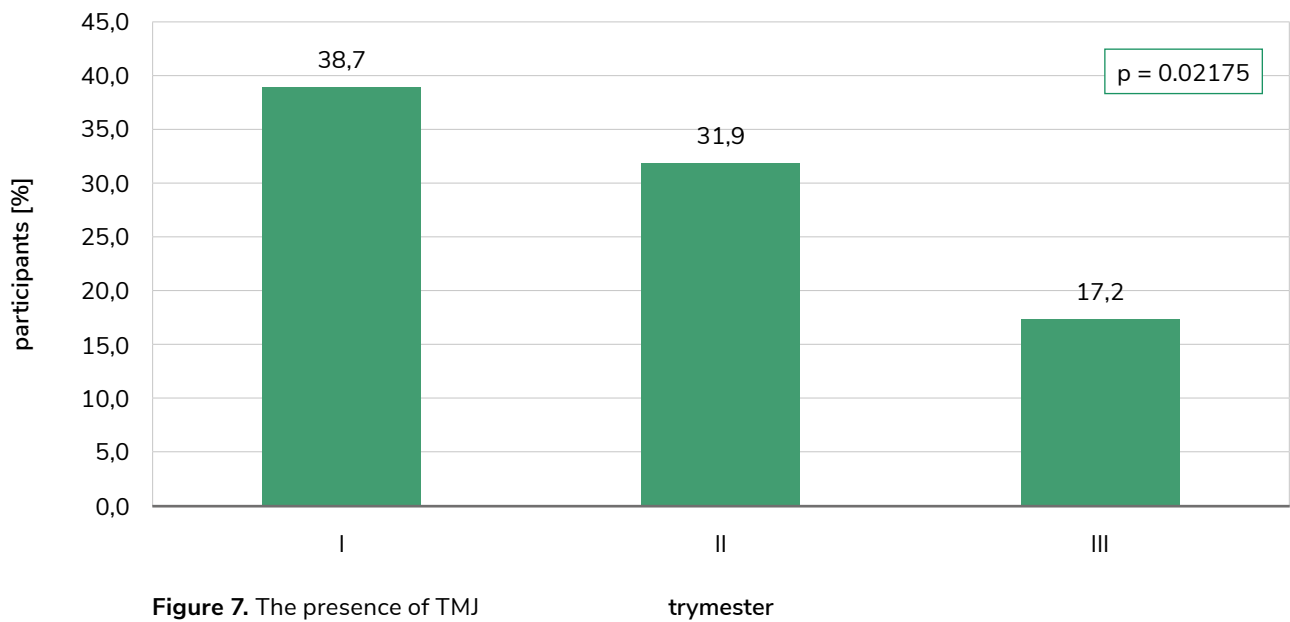


Figure 7. The presence of TMJ pain in particular trimesters of pregnancy.

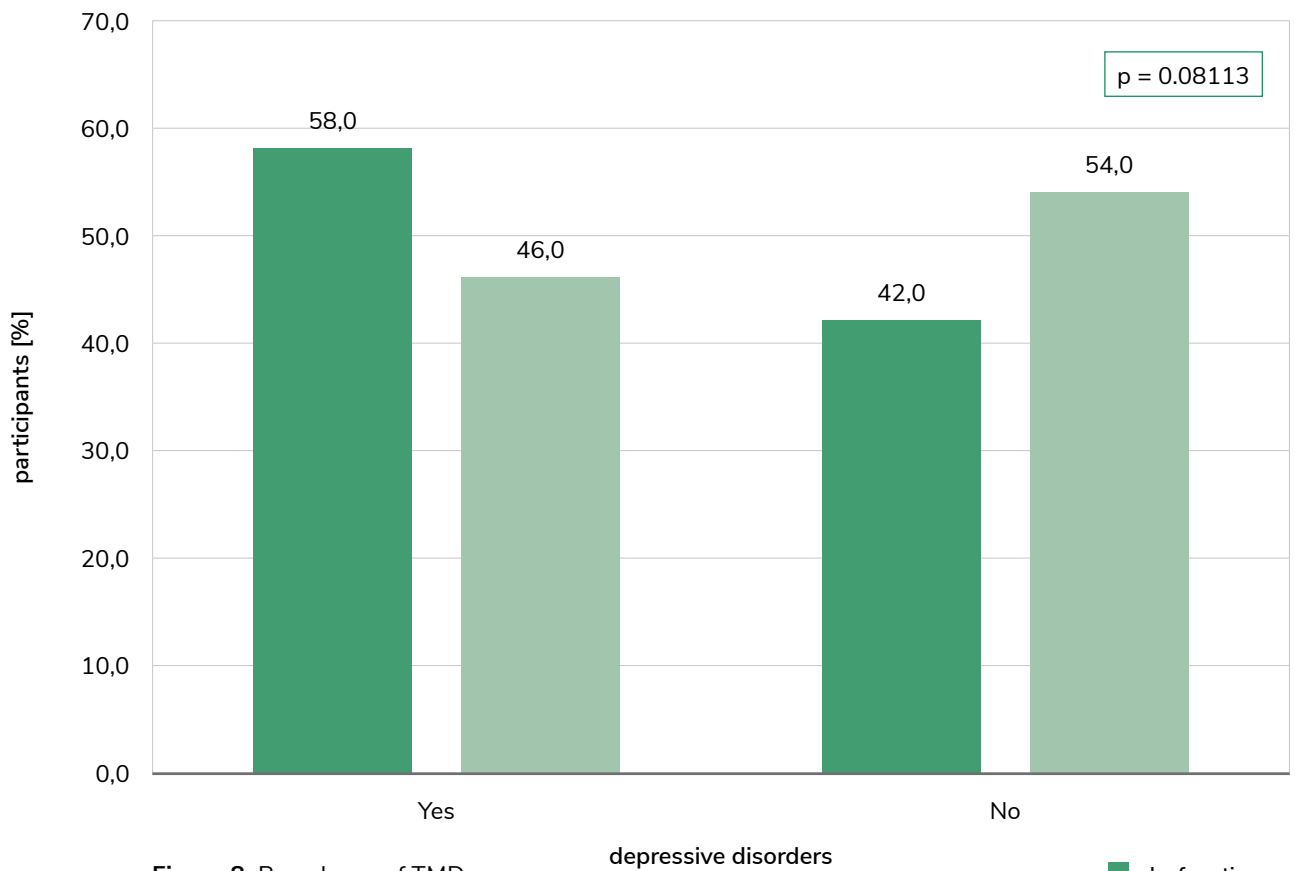
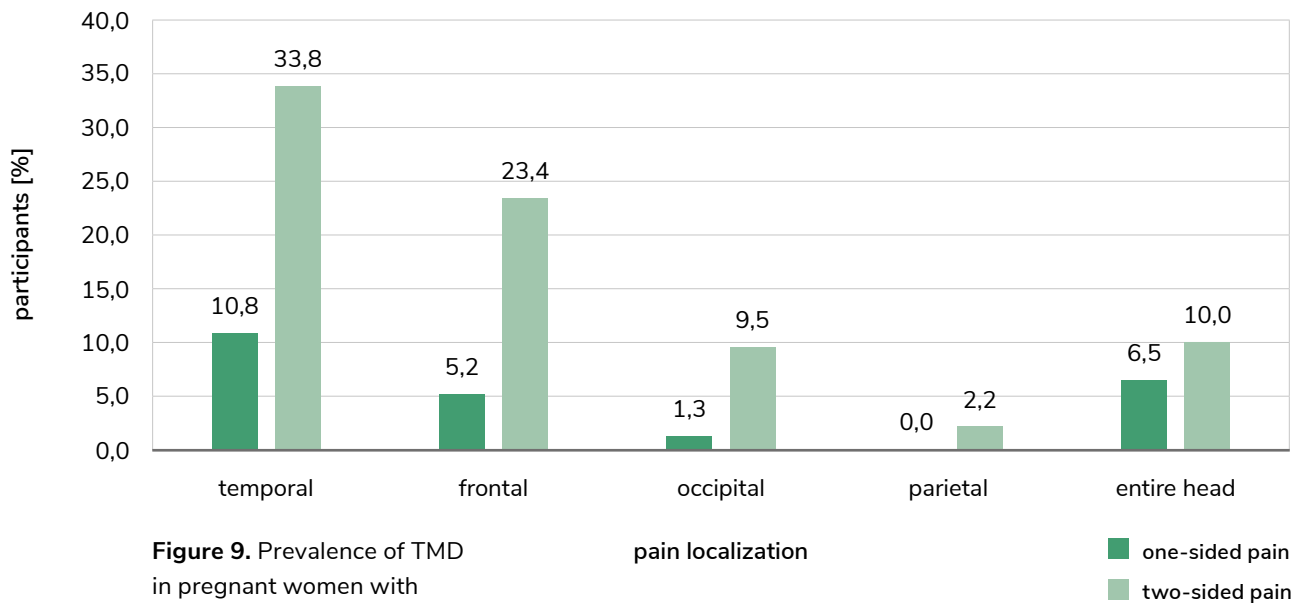


Figure 8. Prevalence of TMD in association with depressive disorders.

■ dysfunction
■ no dysfunction



Discussion

Robinson et al. [5] stated that women are three times more likely to develop the chronic form of dysfunction, while the acute form has a comparable occurrence in both genders. Our study confirmed the presence of TMJs dysfunction in pregnant women. Study conducted by Ivković et al. [7] revealed that elevated estrogen levels during pregnancy have a preventive effect and reduce TMJ pain.

A study conducted by Mayoral et al. [6], compared the presence of TMD in two groups of pregnant women as the study group and non-pregnant women as the control group. The results demonstrated that the occurrence of TMD was three times less frequent in pregnant women, which was again explained by the influence of estrogens and the increased pain threshold during pregnancy. LeResche et al. [8] pointed out that the perception of symptoms decreases during pregnancy but increases again after delivery, which is also related to hormonal changes. Our own study found that dysfunction symptoms increased sig-

nificantly during pregnancy, while a small percentage of subjects also reported that they intensified after delivery. The differences in the results might have occurred due to the fact that for a higher percentage of women in the study, it was their first pregnancy, hence they were not able to relate to the question about their feelings after giving birth. Moreover, the majority of women were during the first or second trimester of pregnancy, so they may not yet have felt a significant difference in their discomfort, which, according to some researchers, is least noticeable in the last weeks of the pregnancy [7]. However, there was a group of women who reported a reduction in symptom severity during pregnancy, which agrees with the findings of other authors.

Our study also analyzed whether changes in a given trimester of pregnancy affected the perception of TMJs pain. The study showed a statistically significant relationship in which pain decreased as pregnancy progressed. Ivkovic et al. [7] observed a similar trend in their study,

the severity of pain symptoms decreased as the pregnancy progressed, with the lowest levels reported around the 36th week.

Weakened mental condition is also one of the predisposing factors for TMD. A study conducted by Abu-Raisi et al. [9] on women, out of which one group was women after pregnancy loss, showed a statistically significant association between experiencing traumatic events and the occurrence of TMD. Our study found no association between depressive disorders and TMD. However, there are studies conducted by other researchers showing that chronic stress, anxiety, or depression predispose to the development of oral parafunction, all of which have a direct impact on the development of TMD [3]. Perhaps, the results of our study were determined by the random selection of the study group, and in the future, in order to re-evaluate this relationship, depressive disorders should be added to the inclusion criteria, or a control group should be provided.

Many authors have argued that headache is a common symptom that occurs alongside TMD. Many times, it is linked to emotional states. According to Sojka et al. [10], chronic stress leads to excessive muscle tension. Tension headaches, most commonly located in the temporal, frontal, occipital or parietal regions, can be a consequence. Our results revealed the same headache locations in the study group, while they did not show a significant association between headaches and TMD. Despite the lack of statistical significance, it can be noted that in pregnant women relatively frequent headaches are associated with TMD (40.5% reported TMD, while their absence was declared by 26.1% of subjects with frequent headaches). Studies by other researchers demonstrated that the presence of parafunctions and TMD can lead to tension headaches [3].

One of the symptoms of TMD is pain occurring in the cervical spine. According to Walczynska-Dragon et al. [11], there was a significant improvement in the range of mobility of the cervical

spine and a decrease in its pain with the progressive healing of TMJs. Kim et al. [12] also came to similar conclusions when investigating the relationship between TMJ dysfunctions and spinal pain. The results showed that the higher the level of TMD, the higher the prevalence of back pain, and the relationship between these characteristics also increased in proportion to the severity of the ailments. Our results showed a significant association between the occurrence of cervical spine pain and TMD in pregnant women. The lack of a significant association between the occurrence of TMD and thoracolumbar pain may result from the fact that if present, it was directly related to pregnancy, which, according to Bhardwaj et al. [13], contributes to the development of pain symptoms in this region. However, Lee et al., [14] reported in their study an increased risk of developing TMD in individuals with lower back pain. The results of our own study mostly show a lack of relationship between qualitative data. For future research on this issue, it is worth considering questioning the collected study group three times at the end of each trimester of pregnancy and including a control group.

Conclusions

Based on our study, it was concluded that approximately 50.2% of pregnant women experience TMJs dysfunction. During pregnancy, an increase in TMD can be observed. The pregnancy stage has a significant impact on TMJs pain, which decreases with successive trimesters of pregnancy. There was no significant association between the presence of TMD and depressive disorders. Furthermore, there was no statistically significant relationship between the presence of TMD and headaches.

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