EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Coden USA: EJBPBO
Volume: 13
Issue: 6
Year: 2026

THE PREVALENCE OF ORAL AND MAXILLOFACIAL DISEASE IN PREGNANT WOMEN AND ITS ASSOCIATION WITH ADVERSE PREGNANCY OUTCOMES

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DOI: https://doi.org/10.5281/zenodo.20442683

How to cite this Article: *Tarek Al Sheshani BDS, Marwan Showayter BDS, Hossam Al Fuqaha BDS, Ahmad Al Khatib BDS, Kais Malallah BDS, Basema Ali MD (2026). The Prevalence Of Oral And Maxillofacial Disease In Pregnant Women And Its Association With Adverse Pregnancy Outcomes. European Journal of Biomedical and Pharmaceutical Sciences, 13(6), 215–220.

Article Received on 01/05/2026 **Article Revised on 22/05/2026** **Article Published on 01/06/2026**

ABSTRACT

Introduction: Pregnancy introduces a unique physiological state characterized by hormonal fluctuations that can affect periodontal health. These changes shape conditions that are favorable to the development of maxillofacial and oral diseases, which makes these associations crucial in the context of developing targeted strategies to reduce health risks and improve outcomes for pregnant women**. Purpose:** This study aims to investigate the incidence of maxillofacial and oral diseases and complications among pregnant women in Jordan. Additionally, it seeks to provide insights into the possible contributing factors for these diseases to enhance healthcare for pregnant women. **Methods**: A cross-sectional, single-center study was conducted at the dental clinic of Prince Hashim bin Abdallah II Hospital in Aqaba, South Jordan, involving 86 pregnant women. Data collection included sociodemographic and clinical information. Oral health assessments were conducted by dental professionals, who evaluated various oral conditions in the period between July to October 2024. This included examining bone, epithelial, and soft tissue pathologies, as well as identifying specific issues such as oral ulcers and mucosal atrophy. **Results**: We found a high prevalence of oral health issues, with oral ulcers present in 58% of pregnant women and mucosal atrophy in 22%. Women with pregnancy complications had a significantly higher occurrence of oral ulcers and mucosal atrophy compared to those without complications. Additionally, benign bone lesions were more frequently observed in women with oral atrophy. **Conclusion**: Our results show a substantially high prevalence of maxillofacial and oral diseases among pregnant women in Jordan, particularly in those with pregnancy complications. There is a critical need for improved dental care and awareness to address these oral health issues during pregnancy, thereby enhancing maternal and fetal health outcomes.

KEYWORDS: Oral disease, Maxillofacial disease, pregnant women, preterm birth, preeclampsia, gestational age, gravidity, parity, obstetric complications.

INTRODUCTION

Pregnant women are at an increased risk to various oral health issues that can potentially pose risks to both their health and their baby's well-being.[1] Hormonal fluctuations during pregnancy have been widely linked to changes in the oral mucosa, many of which are clinically reversible, yet may still potentially complicate pregnancy.[2] Most of these changes are known to clear after delivery; however, certain factors can aggravate some of the conditions.[3]

While dental and periodontal disease in pregnant women are largely preventable, there are huge challenges in improving oral health resources and access to dental care, especially in lower-middle-income countries (LMICs).[4] One of the major difficulties in the provision of oral health during pregnancy is the lack of awareness among pregnant women about the importance of regular dental visits during pregnancy, widespread false information about dental treatments and their safety during this pregnancy, and the pregnant women reporting not having the need to seek dental care while pregnant.[5, 6]

During pregnancy, oral changes range from hyperplasia and pyogenic granulomas (pregnancy tumors) to alterations in salivary composition. Previous reports have also revealed that facial hyperpigmentation occurs and may be attributed to the increased levels of estrogen causing increased capillary permeability, and thus increase the risk of gingivitis and gingival hyperplasia.[7]

There is limited understanding regarding the mechanisms through which oral and maxillofacial diseases specifically impact maternal and neonatal outcomes, particularly in the context of lower-middle-income countries like Jordan. Previous studies have often focused on individual oral health conditions or general pregnancy complications yet have not sufficiently explored the intricate relationships between various oral diseases and adverse pregnancy outcomes.[8, 9] Therefore, in this cross-sectional, single-center study, we aim to investigate the prevalence and types of maxillofacial and oral diseases including oral ulcers and atrophy among pregnant women in Jordan. Additionally, we also aim to identify the potential factors contributing to these conditions related to pregnancy complications and outcomes to better inform strategies for improving oral health care during pregnancy.

METHODS

The study adhered to the ethical principles outlined in the Declaration of Helsinki, and ethical approval was obtained from the institutional ethics committee of the hospital. Informed written consent was obtained from each participant before data collection.

Study Design

We conducted a cross-sectional, single-center study at the dental clinic of Prince Hashim bin Abdallah II Hospital in Aqaba, South Jordan. The study included 86 pregnant women visiting the clinic over the in the period between July to October 2024.

Data Collection

Data were collected using a structured data sheet that captured sociodemographic and clinical information. Sociodemographic data included age, gravida, and parity. Clinical data included gestational age, mode of delivery, medical history, and any pregnancy complications. Oral health assessments were conducted by the attending dentist by evaluating bone, epithelial, and soft tissue pathologies as well as identifying conditions such as oral ulcers and mucosal atrophy.

Statistical Analysis

Data were analyzed using SPSS version 29. Continuous variables were described as medians with interquartile ranges (IQR), while categorical variables were summarized as frequencies and percentages. The chi-square test and Fisher's exact test were employed to assess associations between categorical variables. The Wilcoxon rank-sum test was used to examine relationships between pregnancy complications and oral pathologies. Statistical significance was defined as a p-value of less than 0.05.

RESULTS

A total of 86 pregnant women visiting the dental clinic were included with a median age of 28.5 (23.9, 34.4) years, and median gestational age was 20.0 (10.0, 28.0) weeks (**Table 1**). Mode of delivery was c-section in 44 (51%), and 42 (49%) delivering vaginally. Pregnancy complications were present in 23 (27%) of the patients. Regarding medical history, 44 (51%) had a positive history. Parity and gravida showed that the majority of women (36%) were para 3, and 36% were gravida 5. Oral and maxillofacial pathologies showed that fibro-osseous lesions were seen in 28 (33%) of patients, while 41 (48%) had no bone pathology. Soft tissue tumors were benign in 29 (34%) of cases, and 53 (62%) of patients had no soft tissue tumors. Oral ulcers were seen in 50 (58%) of patients, and 19 (22%) had mucosal atrophy.

When comparing patients based on pregnancy complications, 16 (70%) of women with pregnancy complications had vaginal delivery compared to 7 (30%) in those who had c-section ($p = 0.02$). Oral ulcers were significantly higher in women with pregnancy complications (87%) compared to those without complications (48%), and 15 (65%) of women with complications had mucosal atrophy compared to 4 (6.3%) of those without complications (p-value <0.001) as shown in **Table 2**.

Regarding mucosal atrophy, 15 (79%) of women with mucosal atrophy had pregnancy complications compared to 8 (12%) in those without mucosal atrophy (p-value < 0.001, **Table 3**). Bone pathology also showed significant differences, with benign bone conditions more common in patients with mucosal atrophy (37%) compared to those without (9.0%). Oral ulcers were significantly higher in patients with mucosal atrophy, accounting for 15 (79%) in those with mucosal atrophy compared to 35 (52%) in those without atrophy (p-value = 0.037). Pregnancy complications were significantly more common in those with oral ulcers, accounting for 20 (40%) of women with ulcers cases compared to 3 (8.3%) in women without ulcers (p-value = 0.001, **Table 4**).

Tables

Table 1: Demographic and clinical characteristics of included patients.

Characteristic	N = 86
Age (Years), Median (IQR)	28.5 (23.9, 34.4)
Gestational age (Weeks), Median (IQR)	20 (10, 28)
Delivery, n (%)	
C-Section	44 (51%)
Vaginal	42 (49%)
Pregnancy complications, n (%)	23 (27%)
Parity, n (%)	
1	14 (16%)
2	15 (17%)
3	31 (36%)
4	21 (24%)
5	5 (5.8%)
Gravida, n (%)	
1	4 (4.7%)
2	10 (12%)
3	18 (21%)
4	23 (27%)
5	31 (36%)
Medical History, n (%)	
Negative	42 (49%)
Positive	44 (51%)
Bone pathology, n (%)	
Benign	13 (15%)
Fibro-osseous	28 (33%)
Gian cell lesion	2 (2.3%)
Malignant	2 (2.3%)
None	41 (48%)
Epithelial pathology, n (%)	
Benign	11 (13%)
None	66 (77%)
Reactive	9 (10%)
Soft tissue tumors, n (%)	
Benign	29 (34%)
Malignant	2 (2.3%)
None	53 (62%)
Reactive	2 (2.3%)
Mucosal atrophy, n (%)	19 (22%)
Oral ulcer, n (%)	50 (58%)

Table 2: Comparison in demographic and dental characteristics between pregnancy complications.

Characteristic	No, N = 63	Yes, N = 23	p-value
Age (Years), Median (IQR)	28.5 (24.0, 34.7)	28.2 (24.0, 32.0)	0.7
Medical History, n (%)			0.7
Negative	30 (48%)	12 (52%)	
Positive	33 (52%)	11 (48%)	
Gestational age (Weeks), Median (IQR)	19 (10, 27)	24 (11, 33)	0.4
Delivery, n (%)			**0.02**
C-Section	37 (59%)	7 (30%)	
Vaginal	26 (41%)	16 (70%)	
Parity, n (%)			**<0.001**
1	4 (6.3%)	10 (43%)	
2	7 (11%)	8 (35%)	
3	26 (41%)	5 (22%)	
4	21 (33%)	0 (0%)	
5	5 (7.9%)	0 (0%)	

Gravida, n (%)			**0.014**
1	2 (3.2%)	2 (8.7%)	
2	4 (6.3%)	6 (26%)	
3	11 (17%)	7 (30%)	
4	20 (32%)	3 (13%)	
5	26 (41%)	5 (22%)	
Bone pathology, n (%)			0.3
Benign	10 (16%)	3 (13%)	
Fibro-osseous	21 (33%)	7 (30%)	
Gian cell lesion	0 (0%)	2 (8.7%)	
Malignant	2 (3.2%)	0 (0%)	
None	30 (48%)	11 (48%)	
Epithelial pathology, n (%)			0.4
Benign	9 (14%)	2 (8.7%)	
None	49 (78%)	17 (74%)	
Reactive	5 (7.9%)	4 (17%)	
Soft tissue tumors, n (%)			0.9
Benign	22 (35%)	7 (30%)	
Malignant	2 (3.2%)	0 (0%)	
None	37 (59%)	16 (70%)	
Reactive	2 (3.2%)	0 (0%)	
Mucosal atrophy, n (%)	4 (6.3%)	15 (65%)	**<0.001**
Oral ulcer, n (%)	30 (48%)	20 (87%)	**0.001**

Table 3: Comparison of demographic and dental characteristics between patients with mucosal atrophy.

Characteristic	**No, N = 67**	**Yes, N = 19**	**p-value**
Age (Years), Median (IQR)	29.2 (24.0, 34.8)	27.0 (23.3, 31.4)	0.3
Medical History, n (%)			0.2
Negative	35 (52%)	7 (37%)	
Positive	32 (48%)	12 (63%)	
Gestational age (Weeks), Median (IQR)	20 (10, 28)	18 (10, 27)	0.7
Delivery, n (%)			0.2
C-Section	37 (55%)	7 (37%)	
Vaginal	30 (45%)	12 (63%)	
Pregnancy complications, n (%)	8 (12%)	15 (79%)	**<0.001**
Parity, n (%)			**0.019**
1	6 (9.0%)	8 (42%)	
2	12 (18%)	3 (16%)	
3	26 (39%)	5 (26%)	
4	19 (28%)	2 (11%)	
5	4 (6.0%)	1 (5.3%)	
Gravida, n (%)			0.2
1	2 (3.0%)	2 (11%)	
2	7 (10%)	3 (16%)	
3	14 (21%)	4 (21%)	
4	21 (31%)	2 (11%)	
5	23 (34%)	8 (42%)	
Bone pathology, n (%)			**0.021**
Benign	6 (9.0%)	7 (37%)	
Fibro-osseous	25 (37%)	3 (16%)	
Gian cell lesion	1 (1.5%)	1 (5.3%)	
Malignant	2 (3.0%)	0 (0%)	
None	33 (49%)	8 (42%)	
Epithelial pathology, n (%)			0.4
Benign	10 (15%)	1 (5.3%)	
None	51 (76%)	15 (79%)	
Reactive	6 (9.0%)	3 (16%)	
Soft tissue tumors, n (%)			>0.9

Benign	22 (33%)	7 (37%)	
Malignant	2 (3.0%)	0 (0%)	
None	41 (61%)	12 (63%)	
Reactive	2 (3.0%)	0 (0%)	
Oral ulcer, n (%)	35 (52%)	15 (79%)	**0.037**

Table 4: Comparison of demographic and dental characteristics between patients with oral ulcers.

Characteristic	No, N = 36	Yes, N = 50	p-value
Age (Years), Median (IQR)	47 (40, 62)	54 (41, 67)	0.3
Medical History, n (%)			0.8
Negative	17 (47%)	25 (50%)	
Positive	19 (53%)	25 (50%)	
Gestational age (Weeks), Median (IQR)	21 (9, 27)	17 (11, 30)	0.9
Delivery, n (%)			0.8
C-Section	19 (53%)	25 (50%)	
Vaginal	17 (47%)	25 (50%)	
Pregnancy complications, n (%)	3 (8.3%)	20 (40%)	**0.001**
Parity, n (%)			0.062
1	4 (11%)	10 (20%)	
2	4 (11%)	11 (22%)	
3	11 (31%)	20 (40%)	
4	14 (39%)	7 (14%)	
5	3 (8.3%)	2 (4.0%)	
Gravida, n (%)			0.13
1	2 (5.6%)	2 (4.0%)	
2	3 (8.3%)	7 (14%)	
3	4 (11%)	14 (28%)	
4	14 (39%)	9 (18%)	
5	13 (36%)	18 (36%)	
Bone pathology, n (%)			0.2
Benign	3 (8.3%)	10 (20%)	
Fibro-osseous	12 (33%)	16 (32%)	
Gian cell lesion	0 (0%)	2 (4.0%)	
Malignant	0 (0%)	2 (4.0%)	
None	21 (58%)	20 (40%)	
Epithelial pathology, n (%)			0.5
Benign	5 (14%)	6 (12%)	
None	29 (81%)	37 (74%)	
Reactive	2 (5.6%)	7 (14%)	
Soft tissue tumors, n (%)			>0.9
Benign	12 (33%)	17 (34%)	
Malignant	1 (2.8%)	1 (2.0%)	
None	22 (61%)	31 (62%)	
Reactive	1 (2.8%)	1 (2.0%)	
Mucosal atrophy, n (%)	4 (11%)	15 (30%)	**0.037**

DISCUSSION

Despite being largely preventable, dental and periodontal diseases remain a concern, particularly in lower-middle-income countries where access to oral health resources is limited, and misinformation about dental care during pregnancy persists.[10] In this cross-sectional, single-center study, our findings reveal a substantially high prevalence of oral and maxillofacial diseases among pregnant women. Oral ulcerations were the commonest pathology observed in our study seen in 58% of pregnant women, followed by benign soft tissue tumors seen in 34% of women, and fibro-osseous lesions seen in 33% of pregnant women. In a cohort of 2,481 of pregnant women by Silva et al. showed that the prevalence of more than one oral mucosal lesion such as ulcers have been reported to reach 16.5% among pregnant women in Brazil.[11] A study conducted by Rezazadeh et al. showed that oral mucosal lesions were significantly higher in pregnant women compared to non-pregnant, where oral ulcers were seen in 23.5% and 7.5% of each populations, respectively (odds ratio: 3.79, 95% CI: 2.04-7.04).[12] Gestational age was not related to oral pathologies in our study which is in line with previous studies.[12]

Additionally, our findings reveal that women with pregnancy complications had a higher prevalence of oral ulcers compared to those without complications, suggesting that the physiological changes and hormonal stressors associated with pregnancy complications may contribute to the development of oral ulcers. The mechanism by which oral pathologies influence pregnancy outcomes may be attributed to the role of oral microbiome, in which oral dysbiosis can along with oral inflammation result in microsomia, preterm labor, and possible miscarriages.[13-15]

Moreover, mucosal atrophy was also higher in women with pregnancy complications, accounting for 65% of pregnant women. Mucosal atrophy and tooth loss can be a result of underlying periodontal disease. It has been reported that periodontitis if left untreated can lead to tooth loss and gum infections. Additionally, it has been associated with adverse pregnancy outcomes, including preterm birth and low birth weight.[16, 17] A study by Vergnes et al. reported a high prevalence of tooth decay among pregnant women reaching 52% which was associated with pre-existing dental plaques and low educational background.[18] While other studies reported a prevalence reaching from 47% to 69% in post-delivery women.[19-21]

Our study strengths reside in focusing on a specific and under-researched population which is pregnant women in Jordan, addressing an important gap in the literature regarding oral health during pregnancy in lower-middle-income countries. In addition, we utilized a structured data collection approach with thorough oral health assessments by dental professionals which enhances the reliability of our findings. However, multiple limitations must be addressed in our study. Firstly, implementing a cross-sectional design reveals the data at a single point in time, making it difficult to establish causal relationships between oral health conditions and pregnancy outcomes. Future longitudinal studies must be conducted to record data from pregnant women over a longer time to better understand the causal relationships between oral health and pregnancy outcomes. Moreover, we conducted the study at a single center, which may limit the generalizability of the findings to a broader population of pregnant women in Jordan or other similar settings. Expanding the study to multiple centers across Jordan, and possibly internationally, and including a larger sample size could enhance the generalizability of the findings. Furthermore, exploring the socio-economic and cultural factors influencing access to dental care during pregnancy would provide valuable insights for designing effective interventions to improve oral health services for pregnant women.

CONCLUSION

Our findings demonstrated a substantially high prevalence of maxillofacial and oral diseases among pregnant women in Jordan and show that a significant number of pregnant women had oral ulcers and mucosal atrophy. In addition, women with pregnancy complications were more likely to have oral problems compared to those without complications. Benign bone lesions were more common in women with mucosal atrophy, highlighting a strong link between oral health and pregnancy complications, and the need for better dental care for pregnant women in Jordan.

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