

Clinical Characteristics and Management of Oral Emergencies During Pregnancy: An Eight-Year Retrospective Study

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Research Article

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Abstract

Background

To analyze epidemiology, pattern and management of oral emergency patients during pregnancy.

Methods

This retrospective study included pregnant women admitted to the Emergency Department of Peking University School and Hospital of Stomatology from January 2017 to December 2024. Age, gestational trimester, diagnosis, and emergency management were collected and analyzed. Patients with incomplete medical records were excluded.

Results

A total of 2190 pregnant women were reviewed. The average age was 31.4 ± 4.3 years. Among all patients recruited in this study, the largest proportion were in the second trimester (974, 44.5%). Acute dental pain was the most common category (1404, 64.1%), followed by infections (532, 24.3%), trauma (69, 3.2%), and other oral emergencies (185, 8.4%). The most frequent diagnoses were symptomatic irreversible pulpitis (892, 40.7%), symptomatic apical periodontitis (491, 22.4%), and pericoronitis (411, 18.8%). Emergency management was provided for 1132 patients (51.7%). The management rate differed by disease category ($P < 0.001$) and trimester ($P < 0.001$). The treatment rate of infectious diseases was significantly higher than that of acute dental pain (OR = 28.63, 95% CI: 19.62–41.78, $P < 0.001$). The effective management rate was highest in the first trimester (318/552, 57.6%), followed by the second trimester (519/974, 53.3%) and decreased to the lowest in the third trimester (295/664, 44.4%). Multivariable regression analysis revealed that disease type was the core determinant of management decisions and the overall rate decline with the progression of pregnancy was associated with differences in disease composition across trimesters.

Conclusions

Our findings provide valuable information on the clinical characteristics of oral emergencies during pregnancy and the factors influencing treatment-making decisions.

Introduction

Oral health is an important part of maternal health. Pregnancy is associated with physiological, hormonal, dietary, and behavioral changes. These changes may increase susceptibility to oral diseases

during pregnancy ^[1, 2]. Common oral problems during pregnancy include dental caries, periodontal diseases, pulpal diseases, and pericoronitis of wisdom tooth ^[2].

Oral diseases during pregnancy may lead to adverse pregnancy outcomes ^[3, 4]. Periodontal disease during pregnancy has been proven to be associated with preterm birth, low birth weight and pre-eclampsia ^[5, 6]. These findings support the need for oral health assessment before and during pregnancy.

Current guidelines and consensus statements indicate that oral health care and necessary dental treatment are safe during pregnancy. Pregnancy itself should not be a reason to delay urgent or necessary oral care ^[7, 8]. However, many pregnant women still delay or avoid dental care because of concerns about gestational stage, fetal safety, dental radiography, local anesthesia, and treatment complexity ^[9, 10]. Clinicians may also be reluctant to provide dental treatment during pregnancy ^[11–14]. These factors may contribute to delayed care and emergency dental visits. Based on the issues discussed above, oral emergencies in pregnant women are clinically challenging. However, limited literature is available concerning the epidemiological characteristics and management of oral emergencies in pregnant women.

Therefore, this retrospective study analyzed pregnant women who attended the emergency department of Peking University School and Hospital of Stomatology from 2017 to 2024. The aim was to describe the disease profile, trimester distribution, and management of oral emergencies during pregnancy.

Materials and methods

Patients

A retrospective analysis was conducted. We reviewed the files of pregnant patients seen in the Emergency Department of Peking University School and Hospital of Stomatology from January 2017 to December 2024. All medical information relating to the patients (including age, trimesters, diagnosis and emergency treatment methods) was collected. Patients with incomplete medical data were excluded. To avoid duplicating data, only the first visit was recorded when the same patient visited multiple times for the same disease.

Variables and definitions

Gestational stage was classified as the first trimester (≤ 13 weeks), second trimester (14–27 weeks), and third trimester (≥ 28 weeks) ^[15]. Advanced maternal age was defined as age ≥ 35 years ^[16].

Diagnoses were grouped into four disease categories ^[17]. Acute dental pain included symptomatic irreversible pulpitis, symptomatic apical periodontitis, and periodontic-endodontic lesions. Infections included pericoronitis, abscess, interstitial infection, and other infections. Trauma included traumatic

dental injuries, soft tissue injury and combined dental and soft tissue injury. Other oral emergencies included endodontic emergencies, periodontal emergencies, oral mucosal emergencies, oral bleeding, temporomandibular joint emergencies, and other surgical emergencies.

Effective emergency management

Effective emergency management was defined as an active local intervention provided on the day of the emergency visit for the chief diagnosis. It included emergency endodontic access for pain relief, incision and drainage, irrigation and local medication dressing, indirect pulp capping, hemostasis, debridement and suturing, tooth repositioning and splinting, extraction, and temporomandibular joint reduction. Observation, referral, and advice for elective outpatient treatment were classified as no same-day local intervention.

Statistical analysis

SPSS Statistics, version 21.0 (IBM Corp., Armonk, NY, USA) was used for statistical analysis. Descriptive analyses were performed to obtain the distribution of age and numbers and percentages of different trimesters and different oral emergency types. Pearson's chi-square test was used to compare categorical variables. Fisher-Freeman-Halton exact test was used when expected frequencies were insufficient. Multivariable logistic regression was used to identify factors associated with effective emergency management. Odds ratios (ORs) and 95% confidence intervals (CIs) were calculated. A two-sided P value < 0.05 was considered statistically significant.

The study was approved by the Institutional Review Board of Peking University School and Hospital of Stomatology Ethics Committee and was conducted under the guidance of international ethical standards (PKUSSIRB-2024102151).

Results

General information

A total of 2190 pregnant women were included in this study. The youngest patient was 18 years old, and the oldest was 45 years old, with a median age of 31 years. Regarding gestational stage, the second trimester accounted for the largest number of visits (974 cases, 44.5%), followed by the third trimester (664 cases, 30.3%), and the first trimester (552 cases, 25.2%).

Disease profile

The most common disease categories among pregnant patients were acute dental pain, infections and oral and maxillofacial trauma (including traumatic dental injuries, soft tissue injury and combined dental and soft tissue injury). The incidences of these conditions were 64.1% (1404/2190), 24.3% (532/2190) and 3.2% (69/2190) respectively (Table 1).

The most common diagnoses were symptomatic irreversible pulpitis (892, 40.7%), symptomatic apical periodontitis (491, 22.4%), and pericoronitis (411, 18.8%).

Table 1. Disease category and diagnosis of oral emergencies during pregnancy

Disease category	Diagnosis	n (%)	Total n (%)
Acute dental pain	Symptomatic irreversible pulpitis	892 (40.7)	1404 (64.1)
	Symptomatic apical periodontitis	491 (22.4)	
	Endodontic-periodontal lesion	21 (1.0)	
Infections	Pericoronitis	411 (18.8)	532 (24.3)
	Odontogenic abscesses ^a	78 (3.6)	
	Facial space infection	20 (0.9)	
	Others ^b	23 (1.1)	
Trauma	Traumatic dental injuries	37 (1.7)	69 (3.2)
	Soft tissue injury	19 (0.9)	
	Combined dental and soft tissue injury	13 (0.6)	
Other oral emergencies	Endodontic emergencies ^c	82(3.7%)	185 (8.4)
	Periodontal emergencies ^d	52 (2.4)	
	Oral mucosal emergencies ^e	24 (1.1)	
	Oral bleeding	14 (0.6)	
	Temporomandibular joint dislocation	7 (0.3)	
	Oral and maxillofacial surgical emergencies ^f	6 (0.3)	
Total		2190 (100.0)	2190 (100.0)

^a Apical abscess, periodontal abscess

^b Parotitis, infected jaw cysts, etc.

^c Split tooth, interappointment flare-up, etc.

^d Interdental papillitis, epulis, etc.

^e Oral ulceration, herpetic stomatitis, etc.

^f Post-extraction pain, oral and maxillofacial masses, etc.

Disease distribution across different trimesters

The distribution of diseases varied across gestational trimesters (Pearson's chi-square test, $P < 0.001$). The number of patients with acute dental pain was significantly higher in the second trimester (647 cases), followed by the third trimester (475 cases), with the fewest cases in the first trimester (282 cases). As for oral and maxillofacial infections, more patients sought care in the first and second trimesters (209 cases and 215 cases, respectively), whereas the third trimester had the lowest number of visits (108 cases). The proportion of patients with acute dental pain increased gradually as gestation progressed whereas the proportion of infectious lesions decreased progressively (Table 2).

Table 2
Distribution of oral emergencies among pregnant patients across different trimesters.

Trimester	Acute dental pain n (%)	Infections n (%)	Trauma n (%)	Other oral emergencies n (%)	Total N
First trimester	282 (51.1)	209 (37.9)	25 (4.5%)	36 (6.5)	552
Second trimester	647 (66.4)	215 (22.1)	35 (3.6)	77 (7.9)	974
Third trimester	475 (71.5)	108 (16.3)	9 (1.4)	72 (10.8)	664

Emergency management

Table 3 shows the effective management rate of different oral emergencies across different trimesters. Among all 2190 patients, 1132 cases received effective management, with an overall management rate of 51.7%. There were statistically significant differences in effective emergency management rates among different disease categories ($P < 0.001$). The emergency management rate of infections reached as high as 94.0%, followed by trauma (56.5%), Other oral emergencies (48.1%). The management rate of acute dental pain was only 35.9%.

The effective management rate also differed among gestational trimesters. It was highest in the first trimester (318/552, 57.6%), followed by the second trimester (519/974, 53.3%) and decreased to the lowest in the third trimester (295/664, 44.4%). The difference was statistically significant ($\chi^2=22.76$, $P < 0.001$).

After stratification by trimester, only acute dental pain showed a significant difference across trimesters ($P = 0.002$), with the highest rate of 40.6% in the second trimester. No statistically significant inter-trimester differences were found in the management rates of other emergency conditions.

Table 3
Effective management rate of different oral emergencies across different trimesters

Disease category	First trimester n/N (%)	Second trimester n/N (%)	Third trimester n/N (%)	Total n/N (%)	P value
Acute dental pain	86/282 (30.5)	263/647 (40.6)	155/475 (32.6)	504/1404 (35.9)	0.002
Infections	201/209 (96.2)	200/215 (93.0)	99/108 (91.7)	500/532 (94.0)	0.207
Trauma	13/25 (52.0)	21/35 (60.0)	5/9 (55.6)	39/69 (56.5)	0.889*
Other oral emergencies	18/36 (50.0)	35/77 (45.5)	36/72 (50.0)	89/185 (48.1)	0.830
Total	318/552 (57.6)	519/974 (53.3)	295/664 (44.4)	1132/2190 (51.7)	< 0.001

* Fisher-Freeman-Halton exact test was used for trauma because of small expected frequencies. Pearson's chi-square test was used for the other comparisons.

Multivariable logistic regression

Multivariable logistic regression analysis was performed to identify factors associated with effective management. As shown in Table 4, disease category was the strongest independent predictor. Compared with acute dental pain, infectious diseases had the highest likelihood of effective management ($P < 0.001$, OR 28.63; 95% CI, 19.62–41.78), followed by trauma ($P = 0.001$, OR 2.29; 95% CI, 1.40–3.75) and other oral emergencies ($P = 0.001$, OR 1.67; 95% CI, 1.23–2.28). Regarding gestational trimester, using the first trimester as the reference, the second trimester was associated with a significantly higher likelihood of effective management ($P = 0.037$, OR 1.31; 95% CI, 1.02–1.68), whereas the third trimester showed no significant difference ($P = 0.972$, OR 1.00; 95% CI, 0.76–1.31). Maternal age ≥ 35 years was not significantly associated with the outcome compared with age < 35 years ($P = 0.596$, OR 1.06; 95% CI, 0.85–1.34).

Table 4
Multivariable logistic regression analysis for effective management rate

Variable	OR	95% CI	P value
Age group			
< 35 years	Reference		
>=35 years	1.06	0.85–1.34	0.596
Trimester			
First trimester	Reference		
Second trimester	1.31	1.02–1.68	0.037
Third trimester	1.00	0.76–1.31	0.972
Disease category			
Acute dental pain	Reference		
Infectious	28.63	19.62–41.78	< 0.001
Trauma	2.29	1.40–3.75	0.001
Other oral emergencies	1.67	1.23–2.28	0.001

OR, odds ratio; CI, confidence interval.

Discussion

The most common types of oral emergency conditions in this study were acute dental pain and infections, and the most common diagnoses were symptomatic irreversible pulpitis, symptomatic apical periodontitis and pericoronitis. Previous studies have reported a high burden of periodontal diseases and dental caries during pregnancy^[18–20]. The high prevalence of third molars in women of reproductive age may also contribute to the occurrence of pericoronitis during pregnancy^[21]. These conditions may become potential risk factors for oral emergencies if they are not identified and treated before or during pregnancy, which was consistent with our findings. The high proportion of acute dental pain in our study (64.1%) is clinically important. Symptomatic irreversible pulpitis and symptomatic apical periodontitis often cause severe pain, which compelled pregnant patients to present to the emergency department.

With respect to gestational distribution, the second trimester had the largest number of patients, which may be related to popularization of oral health knowledge during pregnancy as well as dentists' therapeutic recommendations^[22]. Most pregnant tend to seek dental care during the relatively stable second trimester, owing to concerns about teratogenic risks in the first trimester and preterm delivery risks in the third trimester^[23]. The second trimester is often considered a favorable period for dental

procedures because organogenesis has largely been completed and maternal discomfort is usually lower than in late pregnancy ^[24].

Variations in the treatment rate of oral emergencies during pregnancy reflect the combined effects of disease characteristics, gestational concerns and intervention strategies. Infectious diseases had the highest effective management rate while acute dental pain had the lowest rate. In the infection group, 77.3% of cases were pericoronitis, which usually requires pericoronal irrigation and topical medication—relatively simple treatments that are more acceptable to both clinicians and patients. Pericoronal irrigation and topical medication were defined as active treatment in our research. Therefore, the high treatment rate of 94.0% in infectious diseases is likely attributable primarily to the disease composition and the definition of outcomes. The lower management rate for acute dental pain may partly stem from concerns over anesthetics, radiographs, or invasive procedures, as previously reported; however, these mechanisms could not be assessed in our dataset. Differences in treatment-decision-making across diseases reflect the trade-off between risks and benefits ^[10].

The overall effective management rate decreased stepwise from 57.6% in the first trimester to 53.3% in the second and 44.4% in the third ($P < 0.001$). However, this apparent downward trend cannot be automatically attributed to gestational age per se, because the disease composition differs across trimesters (Table 2 shows a relatively higher proportion of infections in the first trimester and a higher proportion of acute dental pain in the third). After adjusting for age, trimester, and disease category, the multivariable logistic regression yielded more rigorous conclusion: disease type was the core determinant of management decisions and the overall rate decline with the progression of pregnancy was associated with differences in disease composition across trimesters.

In the present study, the treatment rate of acute dental pain peaked in the second trimester. As discussed before, the second trimester is generally considered by both patients and clinicians to be the safest window for dental treatment ^[24]. However, the American Dental Association (ADA) has explicitly stated that necessary diagnostic procedures, local anesthesia, radiographs, and emergency treatments can be performed throughout the entire course of pregnancy ^[25]. A previous prospective study demonstrated that dental local anesthesia can be used during pregnancy when appropriate precautions are taken ^[26, 27]. Necessary dental radiography also has a very low fetal risk when modern equipment and proper protection are used ^[28]. The low treatment rate indicated considerable room for improvement.

This study has several limitations. It was a single-center retrospective study in a specialized dental hospital. The findings may not represent general hospitals or primary care settings. Electronic medical records did not provide detailed information on pain intensity, oral hygiene status, previous dental attendance, reasons for refusing treatment, obstetric risk stratification, or pregnancy outcomes. Therefore, the reasons for non-management could not be analyzed. In addition, effective emergency management was used as the main outcome. This outcome does not indicate whether patients

completed subsequent definitive treatment. Future studies should include multicenter data, patient questionnaires, and obstetric follow-up.

Conclusions

Acute dental pain and infectious diseases were the main oral emergencies among pregnant women. Symptomatic irreversible pulpitis, symptomatic apical periodontitis, and pericoronitis were the most common diagnoses. Effective management varied greatly by disease category and gestational stage. Disease type was the core determinant of management decisions: infections had a high management rate while acute dental pain was less frequently managed on the emergency visit. These findings suggest a need for better oral health education, preconception screening, and standardized emergency dental protocols for pregnant women.

Declarations

Ethics approval and consent to participate

This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Ethics Committee of Peking University School of Stomatology, Beijing, China (PKUSSIRB-2024102151). Due to the retrospective nature of the study, the requirement for informed consent was waived by the Ethics Committee.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

Clinical trial number

Not applicable

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Author Contribution

Jie Bai contributed to the conception, design, and interpretation of study. Zhe Wang and Yin-Fei Pu collected and analyzed the data. Zhe Wang and Yin-Fei Pu were involved in drafting the manuscript and revising it critically for important intellectual content. Jie Bai agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. Zhe Wang and Yin-Fei Pu contributed equally to the study and are co-first authors. All authors gave their final approval and agreed to be accountable for all aspects of the work.

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Not applicable.

Availability of data and materials

The datasets used and/or analyzed during the current study available from the corresponding author on reasonable request.

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