Awareness of Obstetricians and Gynecologists Regarding the Association between Periodontal Health and Adverse Pregnancy Outcomes: A Cross-Sectional Study

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Abstract: Background: Periodontal disease is a prevalent chronic inflammatory condition that affects a large proportion of women of reproductive age. Over the past two decades, growing scientific evidence has suggested a possible association between periodontal disease and adverse pregnancy outcomes, such as preterm birth and low birth weight, mediated through inflammatory and microbial pathways. Obstetricians and gynecologists, who provide primary antenatal care, are in a key position to recognize oral health problems and facilitate timely dental care during pregnancy. **Objective**: To assess the awareness, knowledge, attitudes, and clinical practices of obstetricians and gynecologists regarding the association between periodontal health and adverse pregnancy outcomes. **Materials and Methods:** A descriptive cross-sectional questionnaire-based study was conducted among 87 obstetricians and gynecologists. The sample size was calculated using standard statistical methods with 80% power and a 5% level of significance. A structured questionnaire assessed socio-demographic characteristics, awareness and knowledge related to periodontal health, attitudes toward oral health integration in antenatal care, clinical practices, and perceived barriers. Data were analyzed using descriptive statistics. **Results:** Most participants were aged 30–39 years (37.93%), and 55.17% were male. Although the majority (85.06%) agreed that pregnant women should be referred for dental evaluation, only 20.69% had attended oral health-related continuing medical education programs. Awareness of the association between periodontal disease and adverse pregnancy outcomes was reported by 64.37% of respondents. Oral health enquiry and referral practices were inconsistently followed. The most commonly reported barriers were lack of awareness (56.32%) and time constraints (19.54%). **Conclusion:** Obstetricians and gynecologists demonstrated moderate awareness and generally positive attitudes regarding periodontal health in pregnancy; however, routine integration of oral health into antenatal care was limited. Strengthening interdisciplinary education and developing structured referral pathways may help improve comprehensive prenatal care.

Keywords: Periodontal health; Pregnancy outcomes; Obstetricians and gynecologists; Awareness; Antenatal care

Introduction

Pregnancy is a unique physiological state characterized by more amount hormonal, metabolic, and immunological changes that influence various organ systems and the oral cavity [1]. Elevated circulating levels of estrogen and progesterone in pregnancy increase gingival vascular permeability and alter immune responses, thereby enhancing susceptibility to gingival inflammation in the presence of dental plaque [2]. Clinically, these changes often present as pregnancy gingivitis and may contribute to the increase of periodontal disease in susceptible individuals [3].

Periodontal disease is a chronic inflammatory condition initiated by dysbiotic microbial biofilms and characterized by progressive destruction of the supporting cells of the teeth [4]. Although traditionally considered a localized oral disease, periodontal infection has systemic implications. Periodontal pathogens and inflammatory mediators can enter the systemic circulation, contributing to a heightened inflammatory burden [5]. This systemic inflammatory response has a potential biological link between periodontal disease and adverse pregnancy outcomes [6].

Several observational studies have reported an association between maternal periodontal disease and adverse pregnancy outcomes such as preterm birth, low birth weight, and hypertensive disorders of pregnancy[7,8,9]. Proposed biological mechanisms include hematogenous spread of periodontal pathogens to placental–fetal unit and increased systemic levels of inflammatory mediators such as prostaglandin E_2, interleukin-1β, and tumor necrosis factor-α, which are known to influence uterine contractility and cervical ripening [10,11, 12]. Although a definitive causal relationship has not been established, the consistency of these associations has highlighted the importance of periodontal health during pregnancy.

Obstetricians and gynecologists are often the first and most frequent point of contact for pregnant women within the healthcare system. Their awareness of the relationship between periodontal health and pregnancy outcomes is therefore critical for early identification of oral health problems, patient education, and appropriate referral to dental professionals [13,14]. However, studies conducted across different regions have reported variability in awareness levels and a clear gap between knowledge and routine clinical practice among obstetric care providers [15,16,17].

In Bengaluru ,India, where antenatal care utilization is relatively high, limited data are available regarding obstetricians' and gynecologists' awareness and practices related to periodontal health during pregnancy [18,19]. Identifying existing gaps is essential for developing targeted educational programs and strengthening collaboration between medical and dental professionals. Therefore, the present study aimed to evaluate the awareness, knowledge, attitudes, and practices of obstetricians and gynecologists regarding the association between periodontal health and adverse pregnancy outcomes.

Materials and Methods

A descriptive cross-sectional study was conducted among practicing obstetricians and gynecologists in Visnagar, Gujarat, India. Participation was voluntary, and informed consent was obtained from all respondents in beginning of the study.

The sample size was calculated using the formula $n = (Z\alpha/2 + Z1-\beta)^2 \times PQ / L^2$, assuming 80% power, a 5% level of significance, an expected proportion of 90%, and a relative precision of 10%. Based on these assumptions, the minimum required sample size was calculated as 87 participants.

Data were collected using a structured, self-designed with validity and reliability done questionnaire comprising sections on socio-demographic characteristics, awareness and knowledge regarding periodontal health and pregnancy outcomes, attitudes toward oral health integration in antenatal care, routine clinical practices, and perceived barriers to implementation.

Study data were entered into a spreadsheet and analyzed using descriptive statistics. Results were expressed as frequencies and percentages.

Results

The results of this questionnaire-based cross-sectional study are presented in a structured sequence, beginning with the response rate and participant characteristics, followed by findings organized according to the major thematic domains of the questionnaire. Descriptive statistics are used to summarize the data, and tables and figures are provided to facilitate clarity and visual interpretation. The findings are reported objectively, without interpretation.

Response Rate

87 questionnaires were distributed among practicing obstetricians and gynecologists. All 87 questionnaires were filled and returned, response rate was 100%. All returned questionnaires were included in the final analysis.

Participant Profile (Demographic data)

The socio-demographic characteristics of the participants are given in Table 1. The majority of respondents were aged between 30 and 39 years (37.93%), followed by those aged 40 years and above (33.33%), while 28.74% were below 30 years of age. Male participants constituted 55.17% of the study population, whereas females accounted for 44.83%.

In terms of professional experience, a substantial proportion of respondents reported less than five years of clinical practice, while a comparable proportion had more than ten years of experience. The majority of participants were engaged in private practice (65.52%), and 62.07% did not possess a super-specialty qualification.

Table 1: Distribution of study subjects based on socio demographic variables

Variables	Number (n=87)	Percentage
Age		
<30	25	28.74
30-39	33	37.93
40-49	11	12.64
≥50	18	20.69
Gender		
Female	39	44.83
Male	48	55.17
Years in Practise		
<5	37	42.53
5-10	15	17.24
10	35	40.23
Practise Type		
Government	11	12.64
Private	57	65.52
Academic	19	21.84
Super specility in		
Gynaecology oncology	7	8.04
Reproductive Endocrinology & Infertility	7	8.04
Maternal-Fetal Medicine	13	14.94
None	54	62.07
Others	6	6.89

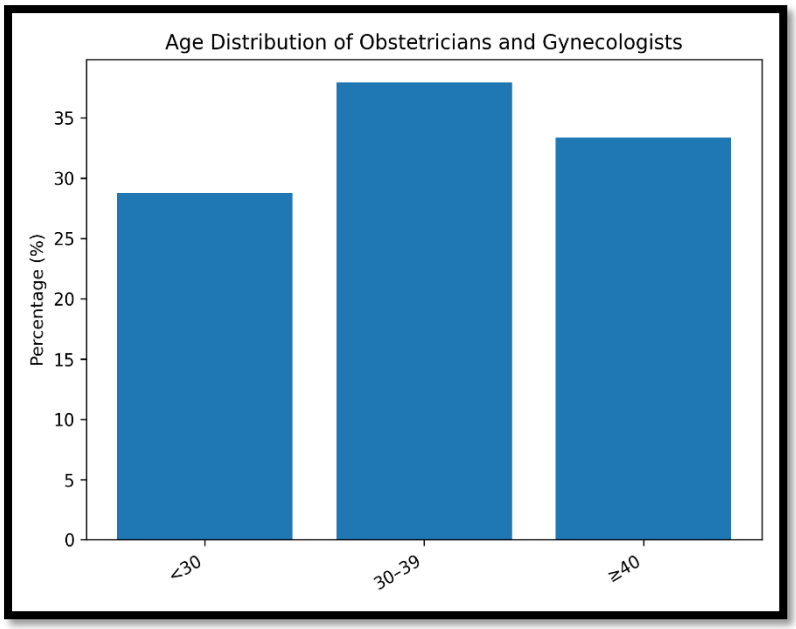

Figure 1. Age distribution of obstetricians and gynecologists

Knowledge Regarding Periodontal Health and Adverse Pregnancy Outcomes

Knowledge-related responses are presented in Table 2. Awareness of the association between periodontal disease and adverse pregnancy outcomes was reported by 64.37% of respondents. A large majority (85.06%) agreed that pregnant women should be referred for dental evaluation during antenatal care.

With regard to specific clinical knowledge, 74.71% of respondents were aware that scaling and root planing can be safely performed during the second trimester of pregnancy. However, 67.81% of participants reported that dental radiographs are contraindicated during pregnancy. Attendance at oral health-related continuing medical education programs was reported by only 20.69% of respondents.

Table 2: Distribution of knowledge response of the study subjects

Knowledge Question	0 (%)	1 (%)	Don't know (%)
Attended Continuing Medical Education (CME) regarding Oral/Periodontal health ?	N=69 (79.31)	Y=18 (20.69)	0 (0)
Obstetricians should refer pregnant women for a dental evaluation during prenatal care	6 (6.89)	74 (85.06)	7 (8.04)
Scaling and root planing are safe in the 2nd trimester	4 (4.60)	65 (74.71)	18 (20.69)
Dental radiographs with proper precautions are contraindicated during pregnancy.	59 (67.81)	20 (22.99)	8 (9.20)
Gingival bleeding during pregnancy always requires evaluation	12 (13.79)	63 (72.41)	12 (13.79)
Maternal periodontal disease has been linked to adverse pregnancy outcomes such as preterm birth/low birth weight	12 (13.79)	56 (64.37)	19 (21.84)

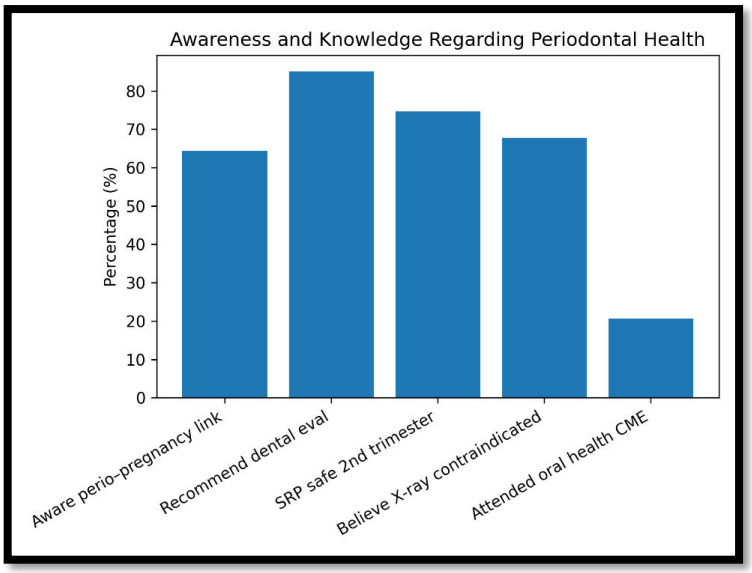

Figure 2. Awareness and knowledge regarding periodontal health and pregnancy outcomes

Attitudes Toward Oral Health Integration in Antenatal Care

Attitudinal responses are summarized in Table 3. More than half of the respondents (65.52%) agreed that poor periodontal health could negatively influence pregnancy outcomes. A substantial majority (80.46%) supported the inclusion of oral health screening as a routine component of antenatal care. Additionally, 78.16% of respondents indicated that obstetricians and gynecologists have a responsibility to advise pregnant women regarding oral hygiene practices.

Table: Distribution of Awareness & Attitude response of the study subjects

Awareness & Attitude Question	Strongly disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly agree (%)
Poor periodontal health can negatively influence pregnancy outcomes	3 (3.45)	5 (5.75)	22 (25.28)	49 (56.32)	8 (9.20)
Oral health screening should be part of antenatal care.	0 (0)	4 (4.60)	13 (14.94)	53 (60.92)	17 (19.54)
I feel responsible for advising pregnant patients about oral hygiene.	0 (0)	2 (2.30)	12 (13.79)	56 (64.39)	17 (19.54)
Pre term / Low birth weight babies are more prone to dental problems	0 (0)	2 (2.30)	36 (41.37)	37 (42.53)	4 (4.60)

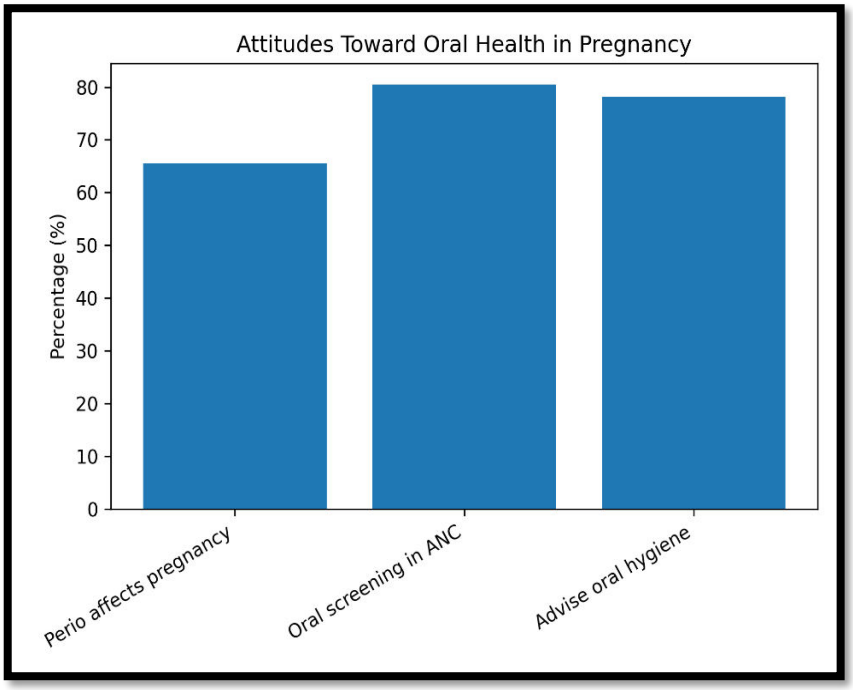

Figure 3. Attitudes toward oral health integration in antenatal care

Clinical Practice Patterns Related to Oral Health

Practice-related responses are presented in Table 4. Only 9.20% of respondents reported that they always enquired about gum problems during antenatal visits, while 55.17% indicated that such enquiries were made occasionally. Referral practices were more favorable with 57.47% of respondents reporting that they always referred patients with periodontal problems to dental professionals.

Despite this, the overall frequency of referrals remained low. A large majority of respondents (89.65%) reported referring fewer than five patients per week for dental evaluation.

Table 4: Distribution of Practise response of the study subjects

Awareness & Attitude Question	Never (%)	Sometimes (%)	Often (%)	Always (%)
Do you ask pregnant patients about gum problems?	14 (16.09)	48 (55.17)	17 (19.54)	8 (9.20)
Do you refer patients with gum disease to a dentist?	3 (3.45)	14 (16.09)	20 (22.99)	50 (57.47)
	0-5	**5-10**	**10-15**	**>15**
How many Patients do you refer to dentist in a week	78 (89.65)	3 (3.45)	4 (4.60)	2 (2.30)

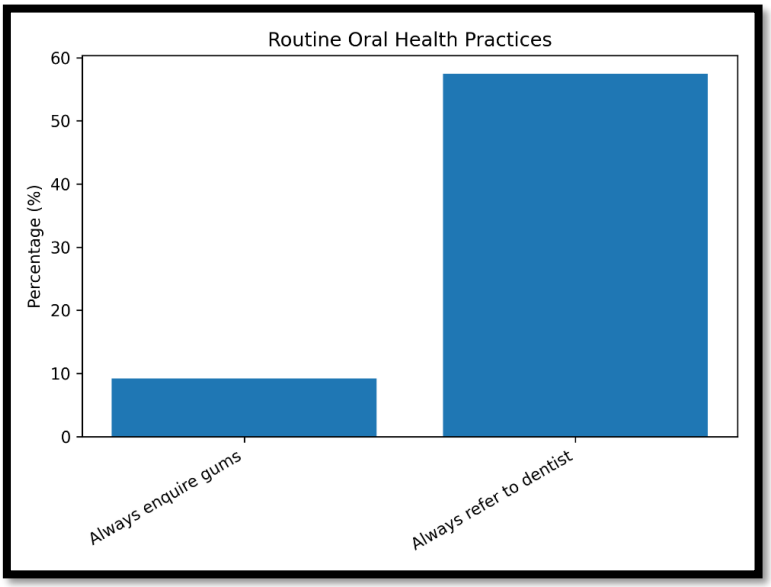

Figure 4. Routine oral health-related practices among obstetricians and gynaecologists

Barriers to Integration of Oral Health into Antenatal Care

Perceived barriers to incorporating oral health into routine antenatal care are summarized in Table 5. The most commonly reported barrier was lack of awareness (56.32%), followed by time constraints during antenatal visits (19.54%). Limited access to dental services was reported by 12.64% of respondents, while patient-related factors such as non-compliance or lack of interest were reported by 11.50%.

Table 5: What prevents you from including oral health in ANC care?

Variables	Number (n=87)	Percentage
Lake of Time	17	19.54
Lake of Awareness	49	56.32
No dental services nearby	8	9.20
Others	13	14.94

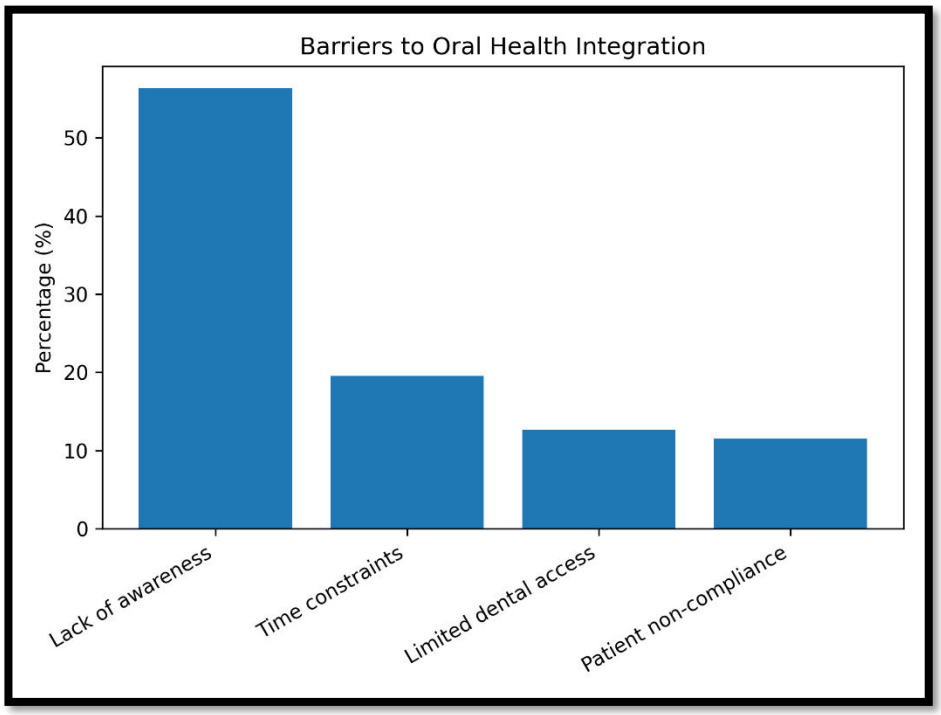

Figure 5. Barriers to integration of oral health into antenatal care

Reliability of the Questionnaire

The internal consistency of the questionnaire was assessed using Cronbach's alpha. The overall Cronbach's alpha value indicated acceptable internal reliability of the questionnaire, supporting the consistency of responses across the knowledge, attitude, and practice domains.

Summary of Results

Overall, the results demonstrate moderate levels of knowledge and generally positive attitudes toward periodontal health among obstetricians and gynecologists. However, routine oral health enquiry and referral practices were inconsistently implemented. Lack of awareness and time constraints were the most frequently reported barriers to integrating oral health into antenatal care.

Discussion

The present study provides important insight into the awareness and practices of obstetricians and gynecologists regarding the association between periodontal health and adverse pregnancy outcomes. Although most respondents demonstrated moderate awareness and positive attitudes, these did not consistently translate into routine oral health assessment or referral during antenatal care.

The level of awareness observed in the present study is comparable to that reported by Tarannum and Prasad (2013), who found moderate awareness among Indian

gynecologists regarding the periodontal–preterm birth association, but limited implementation in practice [18]. Similar findings were reported by Satyanarayana et al. (2016), who observed that although gynecologists recognized the importance of periodontal health, routine referral to dental professionals was uncommon [19]. These findings suggest that awareness alone may be insufficient to bring about meaningful changes in clinical practice.

International studies have reported relatively higher awareness levels. Wilder et al. (2007), in a survey conducted among obstetricians in the United States, reported good theoretical knowledge regarding periodontal–pregnancy associations; however, they also identified inconsistencies in routine oral health enquiry and referral practices [15]. Likewise, Cohen et al. (2015) observed that despite good knowledge among French obstetricians, actual integration of oral health into antenatal care remained limited [16]. These findings align with the present study and highlight the global nature of the knowledge–practice gap.

The persistence of misconceptions regarding the safety of dental procedures during pregnancy, particularly dental radiographs, is a significant concern. Evidence-based guidelines issued by the American Dental Association and the American College of Obstetricians and Gynecologists clearly state that diagnostic dental radiographs are safe during pregnancy when appropriate shielding and precautions are used [21]. However, similar misconceptions have been reported by Detman et al. (2010) and George et al. (2016), who identified fear of fetal harm as a major barrier preventing timely dental care [20,27].

The biological plausibility of an association between periodontal disease and adverse pregnancy outcomes has been extensively explored. Offenbacher et al. (1996) were among the first to propose periodontal infection as a risk factor for preterm low birth weight, suggesting that inflammatory mediators originating from periodontal tissues may influence pregnancy outcomes [10]. Subsequent studies by Romero et al. (2004) further supported the role of systemic inflammation in triggering preterm labor [11].

Systematic reviews and meta-analyses have strengthened the evidence base. Madianos, Bobetsis, and Offenbacher (2013) concluded that periodontal disease is associated with an increased risk of adverse pregnancy outcomes, although heterogeneity among studies limits definitive causal inference [6]. Similarly, Ide and Papapanou (2013) emphasized consistent epidemiological associations while highlighting the multifactorial nature of preterm birth [12]. A meta-analysis by Vergnes and Sixou (2007) reported a significant association between maternal periodontal disease and preterm low birth weight, reinforcing the clinical relevance of periodontal health during pregnancy [26].

Intervention studies have yielded mixed results. While López et al. (2002) demonstrated that periodontal therapy during pregnancy may reduce the risk of preterm low birth weight [8], systematic reviews, including those by the Cochrane Oral Health Group, have suggested that although periodontal treatment during pregnancy is

safe, its effect on preventing adverse pregnancy outcomes remains inconclusive. These findings underscore the importance of prevention, early detection, and interprofessional collaboration rather than reliance solely on treatment during pregnancy.

The low participation in oral health-related continuing medical education programs observed in the present study is concerning. Studies by Mouradian et al. (2005) and Huebner and Milgrom (2010) have shown that targeted oral health education for medical professionals significantly improves knowledge, confidence, and referral practices [24,25]. Incorporating oral health modules into obstetric training curricula and continuing education programs may therefore be an effective strategy to address existing gaps.

From a public health perspective, integrating oral health into antenatal care provides an opportunity for early risk identification and preventive intervention. Gaffield et al. (2011) emphasized that antenatal visits represent a critical window for oral health promotion, particularly among women who may not otherwise seek dental care [13]. Strengthening collaboration between dental and obstetric professionals through structured referral pathways and standardized screening tools may enhance comprehensive prenatal care.

Conclusion

This cross-sectional study demonstrates that obstetricians and gynecologists possess moderate awareness and generally positive attitudes regarding the association between periodontal health and adverse pregnancy outcomes. However, routine integration of oral health assessment and referral into antenatal care remains limited. Strengthening interdisciplinary education, correcting misconceptions, and implementing structured referral pathways are essential steps toward improving comprehensive prenatal care and maternal–fetal health outcomes.

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