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REVIEW ARTICLE **OPEN ACCESS**

Oral Health Research of Pregnant Women in Saudi Arabia: A Narrative Review

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Abstract:

Objective: This review aimed to summarize the available literature describing the oral health of pregnant women in Saudi Arabia.

Methods: Published literature relevant to the topic was searched on PubMed and Google Scholar using keywords related to “Pregnancy”, “Oral Health”, “Oral Hygiene”, “Dental Care”, “Dental Caries”, “Periodontal Diseases” and “Saudi Arabia”. Neither methodological filters nor language restrictions were applied.

Results: A total of 30 studies were included and summarized. Oral health status, prevalence of periodontal diseases and dental caries varied across self-reported studies from 15.5% to 68.5% and from 29.8% to 54.8%, respectively. Limited data were available on oral health-related quality of life. Even when a higher rate (85.9%) was reported, dental visits were driven by problems rather than preventive care. Oral hygiene practices included common toothbrushing, although its frequency varied. For oral health information, the majority of women did not receive any formal oral health education during pregnancy, with a range of 12.4% to 79.4% across studies.

Discussion: The findings show that pregnant women in Saudi Arabia suffer from oral health problems, underutilization of dental services, and low oral health awareness, which may advise reforming healthcare models from a fragmented model to an integrated preventive model.

Conclusion: The current evidence highlights the burden of oral health problems among pregnant women in Saudi Arabia and the substantial gap in oral health awareness and dental care utilization during pregnancy. However, the findings of this review provide suggestive rather than conclusive evidence for the need to integrate oral health into antenatal care to improve maternal oral health and overall well-being.

Keywords: Pregnancy, Oral health, Oral information, Periodontitis, Dental care, Antenatal care.

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1. INTRODUCTION

In a woman’s life, pregnancy represents a unique period with several physical changes, including hormonal modifications, bacterial imbalances, and dietary shifts with increased consumption of carbohydrates [1, 2]. These changes may significantly impact oral and dental health through increasing pregnant women's susceptibility to several oral and dental diseases, including periodontal disease, dental caries, dental erosion, and pregnancy tumors [1-4]. Hormonal modifications include a dramatic increase in estrogen and progesterone levels, leading to vascular changes, modification of the immune response, growth of anaerobic bacteria, decreased salivary flow, increased oral acidity, and increased oral tissue sensitivity to irritation and bleeding [5, 6].

Evidence has supported the relationship between oral conditions and adverse pregnancy outcomes, including preterm birth, low birth weight, and others [2, 7]. Several mechanisms have been proposed to explain this relationship and how oral conditions could negatively affect the development of the fetus and subsequently cause complications [2, 7]. One mechanism is the translocation of specific oral bacteria from an infected periodontal site through the bloodstream, where they cross the placenta, causing bacteremia or premature birth [2, 7]. Another mechanism includes the inflammatory response caused by the systemic dissemination of endotoxins and/or inflammatory mediators produced by oral bacteria and inflammatory sites [2, 7].

Maternal oral health may influence infant oral health and increase the risk of developing early childhood caries through bacterial transmission. Moreover, maternal oral health may be associated with developmental defects of primary dentition [8]. Prenatal oral rehabilitation is recommended to reduce the negative impacts of poor oral health through promoting dental visits, oral hygiene practices, and dietary habits during pregnancy [9].

This narrative review aimed to summarize the available literature describing the oral health of pregnant women in Saudi Arabia. Thus, this review can help in exploring the burden of oral health problems among pregnant women in addition to identifying gaps related to oral health education, oral health practices, and utilization of dental services during pregnancy in Saudi Arabia. Moreover, providing an overview of current evidence in the country may assist in directing future research and public policies and in providing a scientific base to propose an integrated healthcare model in which antenatal care plays a role in routine screening and referral to dental care, which subsequently may improve pregnant women's oral health and overall well-being.

Thus, the following section describes the methodology used, including the inclusion criteria for studies, the search strategy, and the selection criteria. Next, the results section presents a summary of reviewed studies regarding oral health status, Oral Health-Related Quality of Life, dental care utilization, oral hygiene practices, and oral health information, stratified by region. Then, the discussion section analyzes the findings and describes their implications considering clinical, public health, and future research. Finally, a summary of the review findings and future recommendations are illustrated in the conclusion section.

2. MATERIALS AND METHODS

2.1. Inclusion Criteria for Studies

Studies that assessed oral health among pregnant women in Saudi Arabia in terms of oral diseases, Oral Health-Related Quality of Life, dental care utilization, oral hygiene practices, and oral health information were included, regardless of assessment method (self-report or clinical examinations). Studies with mixed populations (pregnant and non-pregnant, pregnant and lactating, pregnant and recently post-partum) were included. Reviews were excluded.

2.2. Search Strategy

Published literature relevant to the topic was searched on PubMed and Google Scholar up to 30 December 2025, using the following keywords: “Pregnancy”, “Pregnant Women”, “Pregnant”, “Oral Health”, “Oral Hygiene”, “Dental Care”, “Dental Caries”, “Periodontal Diseases”, “Gingivitis”, “Periodontitis”, “Saudi Arabia”, “Saudi”, and “KSA”. A search strategy using Medical Subject Headings (MeSH) terms was initially built in PubMed and was then adopted in Google Scholar (**Supplementary File 1**).

2.3. Selection Criteria

Neither methodological filters nor language restrictions were applied. Both the title and abstract were screened for identification of relevant articles. Full texts of the initially identified articles were retrieved, and a subsequent screening for relevance was applied for exclusion and removal of duplications. A manual search was conducted on the reference lists of the selected studies to identify further relevant articles. A total of 5848 records were identified, and 30 studies met the inclusion criteria.

3. RESULTS

Thirty studies were included in this review. This section presents a summary of the studies’ main findings stratified by region (**Supplementary Table 1**).

3.1. Oral Health Status

3.1.1. Periodontal Diseases

Periodontal Diseases (PD) are chronic inflammatory and infectious conditions characterized by the destruction of the soft and hard tissues supporting the tooth. PD is categorized into gingivitis (inflammation confined to the gingival tissues) and periodontitis (inflammation extends to underlying supporting tissue with periodontal tissue attachment and bone loss). PD is prevalent among pregnant women due to physiological and immunological changes [10]. Moreover, the increase in the hormonal levels, estrogen and progesterone, increases the periodontal tissue inflammatory response to dental plaque and alters the composition of oral bacteria [10].

In the Eastern region, three studies reported the prevalence of PD among pregnant women visiting antenatal/maternal clinics or hospitals. A study conducted in Al-Jubail city reported that the prevalence of inflamed and bleeding gums among 252 pregnant women was 24.6% [11]. Additionally, in a study carried out in several centers in Al-Sharaqia, 137 (68.5%) out of 200 pregnant women reported bleeding gums when brushing [12]. In 2025, Aljafar A. *et al*. distributed a questionnaire among pregnant women in Dammam, Al Khobar, and Dhahran, where more than half (56.6%) of 606 pregnant women reported bleeding gums [13].

In the Central region, nine studies reported the prevalence of PD. In Riyadh capital city, six studies were

found. Among 500 pregnant women attending a prenatal clinic in a University Hospital in Riyadh, more than two-thirds (65%) complained of bleeding gums with brushing [14]. A study conducted among 446 pregnant women attending obstetrics and gynecology clinics in two governmental hospitals in Riyadh, 40%, 24%, and 23% reported bleeding gums, painful gums, and swollen gums, respectively [15]. Another study reported that 55.8% (n=242) and 28.9% out of 438 pregnant women who attended an obstetrics/gynecology clinic in multiple centers in Riyadh suffered from gingival bleeding and redness, respectively [16]. On the other hand, in another study, only 10% out of 258 pregnant women recruited from two governmental hospitals reported having gum diseases [17]. A study by Moawed S. *et al.* (2019) reported a prevalence of 42.4% for dental problems (caries and periodontitis) among 200 pregnant women who attended primary care clinics and schools in Riyadh and Dawadmi Region [18]. Al-Turk K. *et al.* (2021) collected data from 818 women (87.5% were not pregnant at the time of the study) residing in Riyadh using a questionnaire distributed *via* social media platforms and reported a prevalence of 46.1% for bleeding gums with brushing [19]. Sayeed G. & Varghese S. (2024), recruited 144 pregnant women with metabolic syndrome form maternity hospitals, 33.3% (n=48) had gingivitis, while 18.1% (n=26), 27.8% (n=40), and 20.8% (n=30) had mild, moderate, and severe periodontitis, respectively, based on periodontal examination using Gingival Index, Plaque Index and American Association of Periodontics case definition of periodontitis [20]. For Al Qassim province, one study included 317 participants visiting Maternity and Pediatric Hospital in Buraidah found that participants (pregnant women and lactating mothers) suffered from moderate gingivitis based on papillary, marginal and attached gingiva index (1.39) and have fair oral hygiene based on the mean value of Simplified Oral hygiene Index (1.35) [21]. Another study identified periodontal status using Plaque Index and Periodontal Disease Index and found that the prevalence of gingivitis and periodontitis were 78.9% (n=300) and 21.1% (n=80), respectively, among 380 pregnant women who visited the Maternal and Children's Hospital in Buraidah [22].

For the Southern region, two studies reported PD prevalence during pregnancy using self-reported questionnaires only. The first study was conducted in Sabya (part of Jazan); 97 (24.3%) of 400 pregnant women attending health care centers reported having unhealthy gums [23]. Moreover, 126 (31.5%) noticed changes in their gum health, with 62 (15.5%), 42 (10.5%), 32 (8%), and 11 (2.8%) of them reporting suffering from bleeding, pain, swelling, and ulcers in gums, respectively [23]. The other study conducted in Aseer reported a prevalence of approximately 28% (n=69) for bleeding gums and 29% (n=72) for gum redness and swelling among 251 pregnant women who visited the Child & Maternity Hospital [24].

Regarding the Western region, four studies collected data regarding PD condition during pregnancy. A study conducted in Al Madinah city among 250 women found that the severity of periodontal disease was significantly higher among pregnant women with gestational diabetes (37%) compared to those with no gestational diabetes (29%) and those who were not pregnant (14%) using the Community Periodontal Index for Treatment Need [25]. Another study conducted in Makkah city in primary health care centers and the Maternity and Children Hospital found that the mean prevalence of severe gingivitis across the three trimesters was 66.8%, with deep pocket development (> 6 mm) occurring in the 2nd and 3rd trimesters among 78 pregnant women using the Periodontal Disease Index [26]. In Jeddah city, two studies were found. The first study included 361 participants who visited obstetrics and gynecology clinics in several hospitals (21.05%, 76 participants were pregnant); 36.84% (n=28), 21.05% (n=16), and 18.42% (n=14) among pregnant women reported gingival bleeding, gingival enlargement, and painful gingiva, respectively [27]. The second study included 1350 participants who attended the primary healthcare centers for antenatal care, where 26.7% (n=360) reported suffering from gum problems (redness, swelling, and bleeding) during pregnancy [28].

Finally, a study conducted among 363 women attending different obstetrics clinics in three main cities (Riyadh, Jeddah, and Dammam), 15.4% (n=56) participants perceived having gum disease, while a higher percentage of 41.8% (n=152) reported bleeding from brushing [29].

3.1.2. Dental Caries

Dental Caries (DC) is a common chronic infectious disease caused by the metabolism of sugars by cariogenic bacteria, primarily *Streptococcus mutans*, which produce acid that demineralizes the hard tooth structure over time. During pregnancy, some changes occur, including dietary changes (*e.g.*, increased snacking and craving for sugar), poor oral hygiene caused by nausea and vomiting, an increase in mouth acidity due to vomiting, especially during the first months of pregnancy, and dryness of the mouth [1, 30]. DC negatively impacts pregnant women as it may cause severe pain, infections, and increase child caries risk.

In the Eastern region, only one study in Jubail city by Assery MK. (2016) assessed caries experience and reported a prevalence of 29.8% for carious teeth among 252 pregnant women [11].

In the Central region, three studies assessed caries experience. In Qassim province (Buraidah), Sedky NA. (2016) measured dental caries using the Decayed, Missing, and Filled Teeth (DMFT) index and found that among 317 participants (234 pregnant and 83 lactating mothers), caries prevalence was 100% with a mean DMFT of 10.37 representing a moderate caries index [21]. Based on a self-reported questionnaire, in Riyadh city, Ahmed A. *et al.* (2017) found that 35% (n=151) of 438 pregnant women suffered from DC [16]. Moreover, another study by Ramisetty-Mikler S. *et al.* (2018) reported a comparable prevalence of 40% among 258 pregnant women [17].

In the Western region, in Jeddah city, Sonbul H. *et al.* (2017) examined 121 women attending an obstetrics & gynecology clinic at a University Hospital and reported DMFT values of 10.7±5.2 and 12.3±5.3 among pregnant and non-pregnant women, respectively [31]. Based on self-reported questionnaires, two other studies [27, 28] reported a prevalence of 54.8% for decayed teeth among 1350 women [28] and 50% (n=38) for carious teeth that need fillings among 76 pregnant women [27]. In Makkah city, only one study by Al-Harbi S *et al.* (2020) was conducted using clinical assessment and reported a DMFT of 8.3±4.4 with a mean Decayed component of 3.9±2.9 among 78 pregnant women [26].

3.2. Oral Health-related Quality of Life (OHRQoL)

Only two studies assessed OHRQoL among women during pregnancy in the country. Al-Turk K. *et al.* (2021) assessed OHRQoL among 818 women residing in Riyadh city (87.5% were not pregnant at the time of the study) using the Arabic version of the standard Oral Health Impact Profile (OHIP-14) [19]. 701 women (85.7%) were found to have good OHRQoL with significant associations with education level, frequency of brushing and flossing, bleeding while brushing, and having a toothache [19]. Aljafar A. *et al.* (2025) also utilized OHIP-14 and assessed OHRQoL among 606 pregnant women in Dammam, Al Khobar, and Dhahran and reported a total mean score of 12.97±11.02, with the highest mean score found for the physical pain domain (2.47±2.32) while the lowest mean score found for the functional limitation domain (0.69±1.14) [13]. Moreover, the study found that OHRQoL was significantly associated with the number of previous pregnancies, the number of trimesters of pregnancy, level of education, and oral problems. The highest mean score of OHIP-14 was observed among those who felt embarrassed due to the appearance of their teeth (20.88± 10.92), while the lowest OHRQoL was observed among those who suffered from bad breath (14.2±11.3) [13].

3.3. Dental Care Utilization

Routine dental care utilization is integral for maintaining oral health among pregnant women and preventing negative consequences of dental problems. Several factors may be associated with underutilization of dental care services among pregnant women, including concerns about safety, fear, and low awareness [19, 23, 32-34].

In the Eastern region, several studies conducted among pregnant women in different cities have assessed dental care utilization during pregnancy. Assery M. (2016) found that more than half (58.7%, n= 148) of 252 pregnant women visiting Al-Jubail antenatal clinic were not advised by their doctors to visit the dental clinic, and about half did not receive dental care and believed that dental treatment during pregnancy adversely affected the fetus (50.8%, n=128) [11]. Albasry Z. *et al.* (2019) conducted a study among 270 pregnant women who visited prenatal clinics in three cities (Al Khobar, Qatif, Dammam) and found that 118 (43.7%) of pregnant women visited the dentist when they had a dental problem, with 40.7% visiting the dentist during the second trimester, while 142 (52.6%) of pregnant women reported avoiding dental visits during pregnancy, especially during the third trimester [32]. Moreover, the study found that the most common reason for dental visits was toothache (26.7%) followed by bleeding gum (17.8%), while the most common reason for avoiding dental visits was concerns about the safety of the treatment (24.8%) followed by fear (17%) [32]. In another study conducted in different hospitals and health centers in three cities (Dhahran, Al Khobar, Dammam) by AlRatroot S. *et al.* (2021), 185 (22.4%) out of 825 pregnant women reported that pain or trouble with teeth, gums, or mouth was the main reason for dental visits during pregnancy [35]. Bokhari S. *et al.* (2024) distributed a questionnaire to 356 married females who visited the Mother & Child Hospital in Al-Ahsa and found that 183 (51.4%) did not visit the dental clinic during pregnancy, with the main reason being the lack of need for services (n=131, 36.8%) [33].

In the Central region, the majority of studies were conducted in the capital city (Riyadh). In Riyadh, a study by Al-Swuailem A. (2015) reported that only 20.9% of 446 pregnant women from two governmental hospitals visited the dental clinic during pregnancy [15]. Al-Turk K. *et al.* (2021) found that more than one-third (44.5%) of 818 female participants (87.5% were not pregnant at the time of study) did not visit the dentist during pregnancy, with no need for a dental visit and worrying from harming the baby reported as the main reasons for avoiding dental visits during pregnancy (40.6% and 17%, respectively) [19]. Al Humaid G. *et al.* (2024) found that only 108 (22.5%) of 481 participants from the obstetrics and gynecology department in the Eastern region and Riyadh city visited the dental clinic during pregnancy [36]. Hebbal M. *et al.* (2025) conducted a study among 1120 pregnant women who visited maternal hospitals and found that 39.6% did not utilize dental services during pregnancy, 58.9% occasionally utilized dental services, with dental emergency and dental hygiene/prophylaxis being the most commonly used services (14.6% and 11.8%, respectively) [37]. In Al Qassim province, only one study assessed dental visits and found that 92 (24.2%) had a dental visit during pregnancy out of 380 pregnant women who visited the Maternal and Children's Hospital in Buraidah [22]. Moreover, the study found that the prevalence of periodontal diseases was higher (56.8% gingivitis and 18.9% periodontitis) among pregnant women who did not visit the dental clinic during pregnancy compared to those who visited the dental clinic (22.1% gingivitis and 2.1% periodontitis), with a significant correlation between dental visits during pregnancy and periodontal disease [22].

For the Southern region, few studies were conducted among pregnant women. In Jazan, one study was conducted among 400 pregnant women attending antenatal care in different healthcare centers in Sabya. The study found that more than two-thirds (n=319, 79.8%) of pregnant women had a dental visit during pregnancy, with pain (n=125, 31%) and dental caries (n=85, 21.3%)

being the main reasons for the visit. On the other hand, 20.2% (n=80) did not visit the dental clinic [23]. In Aseer, one study reported that more than one-third (n=103, 41.03%) of 251 pregnant women who visited Child & Maternity Hospital did not visit the dentist for a checkup during pregnancy, although 28% (n=69) suffered from bleeding gums and 29% (n=72) suffered from redness with swollen gums [24].

For the Western region, in Makkah city, only one study was conducted and found that dental visit prevalence was 85.9% among 78 pregnant women, which was slightly lower compared to 88.3% among 145 non-pregnant women visiting primary health care centers and Maternity and Children Hospital [26]. Moreover, dental visits were problem-driven due to pain among both non-pregnant (75.2%) and pregnant (66.7%) women [26]. In Madinah city, only one study was conducted among 360 pregnant women who visited antenatal clinics of multiple hospitals and centers, assessing reasons for avoiding dental visits during pregnancy, where the majority of participants reported the main reasons as the unsafeness of dental local anesthesia (n=157, 43.6%), followed by difficulty of transportation (n=135, 37.5%) and unsafeness of dental treatment (n=68, 18.9%) [34]. In Jeddah city, Azab R. *et al.* (2024) conducted a study among 361 women who visited obstetrics & gynecology clinics in 3 different centers; the main reason for not visiting the dentists among 76 pregnant women was reported as “dental care is hazardous to the infant” by 31.57% (n=24) [27]. Al Agili D. *et al.* (2025) assessed dental utilization among 1350 females who visited different primary healthcare centers and found that only 419 (31.0%) utilized dental care during pregnancy, with check-ups being the most highly used service (n=296, 70.6%) among other services (prophylaxis, fillings, periodontal treatments, extractions, radiographs, and others) [28]. On the other hand, one-third (n=459, 34.0%) needed dental care during pregnancy but were unable to access it due to cost (n=227, 49.5%) and concerns that dental care is unsafe during pregnancy (n=172, 37.5%), which were the main barriers [28]. Finally, the study found that pregnant women who were advised by a physician or nurse to visit a dentist during a prenatal visit had twice the prevalence of visiting a dentist during pregnancy compared to those who were not advised (53.6% *vs* 26.3%) [28].

For the Northern region, only Alazmi A. *et al*. (2020) conducted a study among 154 female participants residing in Hail city, and only 33% (n=50) of participants reported visiting the dentist during pregnancy, with lack of need (n=63, 41%), fear of harm to self or baby (n=49, 32%), and lack of time (n=22, 14%) being the main reasons for not visiting the dentist [38].

Finally, Moad S. *et al.* (2014) conducted a multi-city study among 363 female participants attending antenatal or postnatal care in Riyadh, Jeddah and Dammam. The study reported that more than two-thirds of participants (62.8%) were not informed by any health professional to visit the dentist during pregnancy. On the other hand, among those recommended to visit the dentist during pregnancy, 12.4% received the recommendation from the dentist while only 3.3% received it from their obstetrician [29].

3.4. Oral Hygiene Practices

Practicing good oral hygiene during pregnancy is important for maintaining oral health and reducing the risk of complications of oral problems. Mainly brushing and flossing are critical to control plaque accumulation and prevent dental problems.

In the Eastern region, several studies have assessed personal hygiene practices by pregnant women. Assery M. (2016) reported that among 252 pregnant women who visited Al-Jubail antenatal clinic, 84 (33.3%) of participants brushed their teeth twice a day while 37 (14.7%) never brushed their teeth [11]. Another study in Dammam reported that 100 (51.5%) and 84 (43.8%) of 197 pregnant women who visited the obstetrics and gynecology department brushed their teeth at least twice daily and sometimes flossed, respectively [39]. Tarek Y. *et al.* (2021) distributed an online questionnaire to pregnant women aged 20-40 years old residing in the Eastern region, with more than two-thirds (n=269, 61.4%) of 438 participating pregnant women brushing their teeth more than twice daily, while only 43 (9.8%) used dental floss [40]. In Al-Ahsa city, among 356 married women who visited Mother and Child Hospital, 170 (47.8%) brushed their teeth twice daily while 37 (10%) reported not brushing their teeth at all [33]. Moreover, almost half of the participants reported ever using mouthwash (n=206, 57.9%) while less than 10% reported using dental floss daily (n=28, 7.9%) [33].

In the Central region, the majority of studies were conducted in Riyadh capital city. Al-Turk K (2005) conducted a study among 500 pregnant women in the waiting room of the University Hospital through questionnaire-based interviews, where less than half (n=232, 46.4%) of the pregnant women reported brushing twice a day, and those in the first trimester of pregnancy had significantly lower frequency of brushing (not every day) than those who were in their second and third trimester of pregnancy [14]. Also, the study found that more than half of the participants used a medium-textured toothbrush (n=278, 55.6%) with regular fluoride toothpaste (n=410, 82%), while the majority (n=400, 80%) never flossed their teeth [14]. Another study by Al-Swuailem A. (2015), conducted among 446 pregnant women attending obstetrics and gynecology clinics in two governmental hospitals, reported that more than two-thirds (73.6%) brushed their teeth at least once per day [15]. In another study by Ahmed A. *et al.* (2017), almost two-thirds (n=262, 59.8%) of 438 pregnant women who visited the obstetrics/gynecology department at a medical city reported brushing their teeth twice or more daily [16]. Moawed S. *et al.* (2019) recruited 200 pregnant women from primary care centers and schools in Riyadh and Dawadmi, where 167 (83.5%) agreed to the statement “clean teeth daily through brushing and toothpaste is an important thing for pregnant women” and 136 (68.3%) agreed to the statement “flossing is important for

maintaining oral hygiene and dental health" [18]. Al-Turk K. *et al.* (2021) collected data among 818 women (87.5% were not pregnant at the time of study) residing in Riyadh city using a questionnaire distributed through social media platforms and reported that more than half of participants (n=440, 53.8%) brushed two to three times a day while only 16.5% (n=135) used floss daily [19]. Sayeed G. *et al.* (2024) conducted a study among 144 pregnant women who visited a maternity hospital, in which 43.8% (n=63) reported brushing twice daily and flossing once per day [20]. In Al-Qassim province, specifically in Buraidah, 43.85% of 317 women visiting the Maternity and Pediatric Hospital reported brushing their teeth twice daily, while only 0.95% reported flossing correctly twice daily [21]. In another study in Buraidah, 188 (49.5%) reported brushing twice daily, 24 (6.3%) used mouthwash once daily, and 64 (16.8%) used it twice a week out of 380 pregnant women who visited the Maternal and Children's Hospital [22].

For the Southern region, only one study reported oral hygiene practices among pregnant women. The study was conducted among 400 pregnant women attending antenatal care at different healthcare centers in Sabya (part of Jazan), where most (n=358, 89.5%) primarily used a toothbrush for oral care and fewer than half (n=181, 45.3%) brushed their teeth twice daily [23].

For Western region, in Makkah city, only one study was conducted among 223 women (78 pregnant, 145 non-pregnant) visiting primary health care centers and Maternity and Children Hospital, which reported oral hygiene practices, where the majority (98%) of both pregnant and non-pregnant women used a toothbrush and fluoridated toothpaste [26]. Moreover, among the 78 pregnant women, approximately two-thirds reported brushing twice daily (64.1%) while less than one-third reported using dental floss (29.5%) [26]. In Jeddah city, only one study was found, in which pregnant women reported a lower frequency of brushing three times daily (n=28, 36.84%) compared to non-pregnant women (n=130, 45.6%) who were recruited from antenatal clinics in multiple hospitals and primary care centers [27].

Finally, Moad S. *et al.* conducted a multi-city study among 363 female participants attending antenatal or postnatal care in Riyadh, Jeddah and Dammam, where more than two-thirds of Saudi females (66.5%) reported brushing their teeth more than once daily and only 30.8% of them used either floss or toothpicks to clean between their teeth [29].

3.5. Oral Health Information

Providing oral health education, information, or advice is crucial to improve pregnant women's awareness of oral hygiene practices and routine dental visits, which subsequently optimizes their oral health during the pregnancy period.

In the Eastern region, Assery M. (2016) found that among 252 pregnant women who visited Al-Jubail antenatal clinic, 95 (37.7%) participants obtained dental knowledge from dentists and dental hygienists, 84 (33.3%) from television and printed media, and 39 (15.5%) from online internet sources [11]. Gaffar B. *et al.* (2016) found that among 197 pregnant women who visited the obstetrics and gynecology department in Dammam city, 12.4% did not have any source of oral health information, while the remaining who received information received it mainly from dentists (36%) or media (30.6%) [39]. Tarek Y. *et al.* (2021) conducted a study by distributing an online questionnaire to pregnant women aged 20-40 years old residing in the Eastern region, and most of the 438 pregnant women reported that the primary source of oral and dental health information obtained was from dentists' influencers on social media [40].

In the Central region, in Riyadh, Al-Turk K. *et al.* (2021) found that more than two-thirds (n=650, 79.4%) out of 818 women (87.5% were not pregnant at the time of study) residing in Riyadh city did not receive any oral health care instruction during pregnancy, and 36% and 29% reported that social media and dentists were the source for their oral health information, respectively [19]. Al Humaid G. *et al.* (2024) found that among 481 participants who visited the obstetrics and gynecology department in the Eastern region and Riyadh, more than two-thirds (74.4%) did not receive oral health education during pregnancy, whereas among those who reported receiving education, they obtained it primarily from dentists, followed by media [36]. Hebbal M. *et al.* (2025) reported that out of 1120 pregnant women who attended several maternal hospitals, 56.2% did not receive information on oral conditions during pregnancy at all, while only 15.1% received it from healthcare professionals and the rest received it from the internet (28.7%) and peers (28.7%) [37]. Among healthcare professionals, dentists were the primary source of information for 13% of pregnant women, whereas gynecologists were the source for only 1.3% of them [37].

For the Southern region, a study conducted in Sabya region (part of Jazan) among 400 pregnant women attending health care centers reported that more than one-third (n=167,41.8%) did not receive any dental and gum care advice, while 76 pregnant women (19%) received advice from a dentist and less than 5% received it from a general practitioner [23].

Finally, a study by Aboalshamat K. *et al.* (2025) approached 300 women residing in Saudi Arabia through a social media questionnaire and found that the majority (n=289, 96.3%) obtained oral health information from dentists, more than two-thirds (n=230, 76.7%) from social media, and only approximately one-third (n=99, 33.0%) from a medical doctor [41].

4. DISCUSSION

The available literature on oral health status among pregnant women highlights the burden of PD across different regions of Saudi Arabia, which aligns with physiological and immunological changes associated with pregnancy, including changes in hormonal levels, the inflammatory response of periodontal tissues to dental plaque, and changes in oral bacterial composition [10]. However, the prevalence of PD varied from 15.5% [23] to

68.5% [12] among self-reported studies, with the majority of studies utilizing gingival bleeding. On the other hand, five studies included clinical examination [20-22, 25, 26], but used different indices which precluded comparisons. Thus, self-reported studies included non-representative samples and were prone to subjectivity and recall bias, which may subsequently have over- or under- estimated PD prevalence [42]. In contrast, the five studies that used clinical examination [20-22, 25, 26] relied on periodontal indices and indicators to measure PD; although they may have reflected PD prevalence more accurately [43], they included mixed populations which may have introduced biases. Although the findings are not definitive, they align with the 51% prevalence reported in a systematic review assessing the prevalence of periodontal disease among Saudi Arabian adults based on studies conducted from 1992 to 2023 [44].

In terms of DC, limited studies in the current literature have assessed DC among pregnant women in the country. However, the studies emphasized the high prevalence of DC, which aligns with pregnancy-associated changes in dietary, oral hygiene, and mouth conditions [30]. However, the prevalence of DC varied across studies from 29.8% [11] to 54.8% [28] due to sampling and methodological limitations. Again, the majority of studies included limited samples and relied on self-reported measures, which are subject to reporting bias and are mostly linked to pain or toothache, capturing only advanced symptomatic lesions, which may have resulted in overestimation of the burden of DC [45]. On the other hand, only 3 studies included clinical examination [21, 26, 31] and reported moderate mean DMFT ranging from 8.3±4.4 [26] to 10.7±5.2 [31], which reflects high variation compared to self-reported studies, mainly attributed to methodological limitations and the inclusion of mixed populations. Despite the inconclusive findings among pregnant women specifically, DC is a highly prevalent condition in the country, as a systematic review that assessed the prevalence of dental caries in Saudi Arabia from 1999 to 2019 reported that the proportion of DC ranged from 0.21 to 1.00 and from 0.05 to 0.99 among primary and permanent teeth, respectively [46].

Regarding OHRQoL, only two studies evaluated OHRQoL among pregnant women in Saudi Arabia, which is considered an important measure that captures the functional, physical, psychological, and social impact of oral problems. The studies provided conflicting findings: the study by Al Turk *et al.* (2021) reported good OHRQoL among more than two-thirds of the participants; however, the majority of women included in the study were not pregnant (87.5%), which limits the generalizability of the findings [19]. On the other hand, Aljafar *et al.* (2025) reported moderate impairment of OHRQoL (mean total score of 12.97±11.02) among 606 pregnant women, with physical pain representing the most impacted domain [13]. This finding is consistent with a recent multi-regional study, which reported a mean OHIP-14 total score of 15.8 ± 14.4, with the highest mean score attributed to the physical pain domain [47]. However, these limited data are insufficient to accurately reflect OHRQoL of pregnant women in the country.

Moving to oral hygiene practices during pregnancy, the findings across regions highlight the pattern and gaps. On the one hand, toothbrushing appears to be common, with variation in frequency and disparities across regions that may be attributed to differences in socioeconomic status, educational level, accessibility to dental care services, and information. On the other hand, daily dental flossing appears to be suboptimal, with consistent findings across regions that may be attributed to a lack of skills, a lack of awareness, and neglect of interdental cleaning importance in maintaining good oral health.

For oral health information, the main finding across studies and regions is that the majority of women did not receive any formal oral health education during pregnancy, which emphasizes the huge gap in integrating oral health education into antenatal care. Moreover, dentists appear as the primary source for oral health information, with a very low contribution of obstetricians and gynecologists, which again emphasizes the lack of integration of oral health education during antenatal visits. Another important aspect to consider in recent studies is relying on oral health information from social media, which raises concerns regarding the accuracy, reliability, and consequences of the disseminated information.

Finally, despite the importance of routine dental visits in maintaining the oral health of pregnant women and preventing the negative consequences of oral health problems, the studies reviewed show a consistent pattern of underutilization of dental care services during pregnancy across all regions. Several studies reported a low rate of dental care utilization among pregnant women, with the lowest reported rate at 20.9% [15]. However, even when a higher rate was reported (85.9%), the visit was problem-driven rather than preventive-driven, with pain being the main reason (66.7%) [26]. This aligns with national-level data from the Demographic and Health Survey of Saudi Arabia (2017); the survey included 55.511 individuals aged between 2 and >65 years and showed that 48.3% visited the dentist at least once last year (males= 49.4% /females= 46.8%), with pain being the main reason for the visit (69.0%), while only 6.4% reported a routine dental visit [48]. However, fear, anxiety, and misconceptions regarding the safety of dental treatment during pregnancy were identified as consistent barriers across all regions, such as possible harm to the fetus from local anesthesia and the dental procedure itself, which subsequently led to avoiding early treatment and worsening of the oral problem. Also, the majority of pregnant women were not advised by their obstetrician or gynecologist to visit the dentist, and those who were advised received the advice from a dentist. However, the findings highlight the integral role of healthcare provider advice, as the study by Al Agili D. *et al.* [28] showed that dental care utilization increased among pregnant women who received advice from their provider compared to those who did not receive any advice.

The findings of this review offer several clinical and public health implications in addition to recommendations for future research. The findings emphasize the huge gaps in awareness of oral health, oral hygiene practices, behavior, and dental care service utilization among pregnant women in Saudi Arabia. Inadequate oral hygiene practices, specifically interdental cleaning, lead to dental plaque accumulation and the initiation of gingival inflammation, as it usually initiates from the interdental site, subsequently causing bleeding gums, risk of progression to periodontitis, and adverse pregnancy outcomes such as low birth weight. The moderate dental caries index among pregnant women may negatively impact maternal health as well as increase the risk of early childhood caries. Furthermore, under-utilization of dental care services, problem-driven utilization, and minimal involvement of non-dental healthcare providers highlight the importance of redirecting and reforming healthcare models from a fragmented model to an integrated preventive model. Oral health screening, education, and referral should be integrated into antenatal care. Moreover, training and involvement of non-dental healthcare providers, such as obstetricians and gynecologists, is integral to reinforce positive oral health behaviors. Improving oral health literacy, correcting misconceptions, and standardization of disseminated oral health information are integral to address through public health strategies. However, the current review findings are suggestive rather than definitive or conclusive due to heterogeneity in sample selection, assessment methods, and study findings, as well as a lack of risk-of-bias assessment. Therefore, future research should incorporate standardized clinical examinations and indices to facilitate comparison across studies and accurately reflect the burden of oral diseases, including dental erosion. Furthermore, future studies should assess behavioral and social determinants of oral health practices and service utilization. Finally, developing and evaluating an integrated care model for pregnant women in a standardized antenatal care clinic will be critical in informing policy and practice.

CONCLUSION

In conclusion, the current evidence summarized in this study underscored the burden of oral health problems (PD and DC) among pregnant women in Saudi Arabia and the substantial gaps in oral health awareness, oral hygiene practices, behaviors, and utilization of dental care services. Moreover, the study findings revealed the spread of oral misconceptions among pregnant women and limited involvement of non-dental healthcare providers in reinforcing oral health during the pregnancy period.

However, the findings of this review provide suggestive rather than conclusive evidence for the need to develop a framework or clinical protocol that reforms the healthcare model from a fragmented model to an integrated preventive model that integrates oral health into antenatal care, in addition to highlighting the need for training non-dental healthcare providers to improve maternal oral health, overall well-being, and prevent negative impacts on mothers and children.

AUTHOR'S CONTRIBUTION

The author confirms sole responsibility for study conception and design, data collection, analysis and interpretation of results, and preparing the manuscript. The author reviewed the results and approved the final version of the manuscript.

LIST OF ABBREVIATIONS

MeSH	=	Medical Subject Headings
PD	=	Periodontal diseases
DC	=	Dental caries
DMFT	=	Decayed, Missing, and Filled Teeth
OHRQoL	=	Oral Health-Related Quality of Life
OHIP-14	=	Oral Health Impact Profile

CONSENT FOR PUBLICATION

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CONFLICT OF INTEREST

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SUPPLEMENTARY MATERIAL

Supplementary material is available on the publisher's website along with the published article.

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