

Original article

Awareness of Oral Health among Pregnant Women: A Cross-Sectional Study in Gharyan, Libya

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Abstract

Pregnancy is accompanied by hormonal and physiological changes that can negatively affect oral health, increasing susceptibility to dental caries and periodontal disease. This study aimed to assess awareness levels and oral health practices among pregnant women attending a primary health care center in Gharyan, Libya. A cross-sectional survey was conducted between June and October 2025, involving 101 pregnant women. Data were collected using a structured questionnaire addressing demographic characteristics, oral hygiene practices, and awareness of oral health during pregnancy. Descriptive statistical analysis was performed using SPSS version 26, and an awareness score was developed to classify participants into different levels of awareness. The findings revealed that although most participants practiced basic oral hygiene, such as tooth brushing, the use of supplementary aids like dental floss was limited. Approximately 66% reported visiting a dentist during pregnancy, primarily due to symptoms such as gum bleeding and toothache rather than preventive care. Only 41% recognized the impact of oral health on pregnancy outcomes, while a considerable proportion were either unaware or uncertain. Overall, 62% demonstrated low or no awareness, whereas only 11% showed high awareness. In conclusion, the study identified inadequate levels of oral health awareness among pregnant women despite the presence of basic hygiene practices. These results underscore the need for targeted educational programs and the integration of oral health promotion into prenatal care services to improve maternal and fetal health outcomes.

Keywords. Oral Health, Pregnant Women, Awareness, Gharyan.

Introduction

Hormonal changes during pregnancy can lead to a higher risk of dental caries and increased periodontal inflammation. Maintaining proper oral hygiene is essential during this period. The blood concentration of estrogen and progesterone increases during gestation, causing swelling of the mucous membranes due to increased vascularization. In combination with decreased immune defenses, this provides a suitable environment for the development of oral inflammatory diseases [1]. Oral health in women can be affected physiologically during pregnancy, puberty, the menstrual cycle, and menopause, as well as non-physiologically by hormonal contraception and hormonal therapy [2].

Elevated progesterone levels can lead to pregnancy gingivitis, characterized by increased redness, swelling, and more frequent gum bleeding. Furthermore, studies continue to reveal a connection between periodontitis and adverse pregnancy outcomes such as premature birth and low birth weight. Some research also indicates an increased risk of dental caries during pregnancy, with the possibility that mothers may transmit cariogenic bacteria to their children due to inadequate oral hygiene and poor feeding practices [3,4]. Additionally, general factors such as an individual's overall health and dietary habits, as well as local factors such as changes in saliva quality or quantity and certain local irritants—including plaque and tartar buildup, misaligned teeth, and poorly fitting restorations or prosthetics—play a significant role.

Psychological factors are also important, as fear of harming the unborn child may cause delays in seeking dental care. The most frequent outcomes include gingivitis, enamel erosion, cavities, pregnancy epulis, and pregnancy-related chloasma [5]. Women planning to become pregnant often do not attend routine dental check-ups and visit the dentist only when urgent issues arise. This lack of awareness and education carries risks to both the oral health of the expectant mother and her fetus. During pregnancy, certain imbalances can cause dental problems that require medical attention, while insufficient maternal knowledge may negatively influence future dietary habits and oral hygiene practices in the child [6], [7]. Maternal health education programs should integrate oral health promotion and culturally competent care [8]. To lessen the burden of diseases, primary prevention of oral diseases in expectant mothers must be improved [9]. This study aimed to determine the awareness of oral hygiene and its associated conditions among pregnant women presenting to a primary health care center in Gharyan city, Libya.

Method

This cross-sectional study was conducted from June to October 2025. This awareness-based study was conducted among pregnant women presenting to the Gharyan primary health care center. Prior to data collection, ethical approval and permission to conduct the study were obtained from the administration of the primary health care center in Gharyan, Libya. Participation in the study was voluntary, and all participants were informed about the purpose and procedures of the study prior to their inclusion in the study. Also, they were assured that their responses would be kept confidential and used only for research purposes. A pre-designed written questionnaire was used.

The questionnaire was developed in English. Self-structured closed-ended questions were adopted from different sources after a literature search and reviewed by a team of experts in oral medicine and public health to ensure content validity. A pilot study was conducted on a small sample of pregnant women to assess clarity and reliability, and necessary modifications were made before final data collection.

The questionnaire was divided into two sections. The first section included 4 questions on demographic characteristics of study participants, i.e., age, education level, employment status, and trimester of pregnancy. The second section of the questionnaire includes 8 questions of awareness of pregnant women regarding dental hygiene and conditions associated with it, as well as the regular hygiene practices they follow.

The collected data were entered and analyzed using SPSS (26). Descriptive statistics were applied to present the characteristics of the study sample, including demographic information, oral habits, and awareness-related responses, using frequencies and percentages. For questions that allowed participants to select more than one response, percentages were calculated based on the total number of respondents. To assess the overall level of oral health awareness, an awareness score was developed using responses to three key questions related to knowledge and attitudes toward oral health during pregnancy.

Responses reflecting adequate awareness were assigned a value of one, whereas incorrect or uncertain responses were assigned a value of zero. The total score ranged from zero to three, and participants were subsequently classified into four awareness levels: no awareness, low awareness, moderate awareness, and high awareness.

Results

A structured questionnaire was distributed to collect data from a sample of 101 pregnant women. The descriptive statistics for age are shown in (Table 1), where the average age of the participants was 29.03 years, with a standard deviation of 4.94 years, ranging from 18 to 40 years, reflecting noticeable variability within the group.

Table 1. Descriptive statistics of participants' age

Variable	Mean	SD	Min	Max
Age	29.03	4.94	18	40

Additionally, as shown in (Table 2), the distribution of participants' characteristics shows that 81% of the women had a university degree, 11% had completed their secondary education, while 08% had postgraduate qualifications. For employment status, 60% were employed, 32% were unemployed, while 8% were students, showing the diversity in their occupational backgrounds. Furthermore, the pregnancy stage showed that 23% of the women were in the first trimester, 39% in the second trimester, and 38% in the third trimester; thus, the sample included women in all stages of pregnancy, with a slightly greater proportion in the second and third trimesters.

Table 2. Frequency distribution of characteristics in all selected participants

Variables		Frequency (n)	Percentage (%)
Age group	18 – 25 years	22	21.8
	25 – 35 years	64	63.3
	35 – 45 years	15	14.9
Education level	Secondary	11	10.9
	University	82	81.2
	Postgraduate	8	7.9
Employment status	Employed	61	60.4
	Unemployed	32	31.7
	Student	8	7.9
Trimester of pregnancy	First	23	22.8
	Second	39	38.6
	Third	39	38.6

Additionally, as presented in (Figure 1), the results provide significant information on pregnant women's oral-health behaviors. Specifically, approximately 42% of the respondents brushed their teeth once a day, while about 34% brushed twice a day. The remaining portion reported brushing occasionally (20%) and never (4%). These findings demonstrate that while more than two-thirds of pregnant women practice tooth-brushing daily, a significant percentage still engage in irregular oral-hygiene behavior.

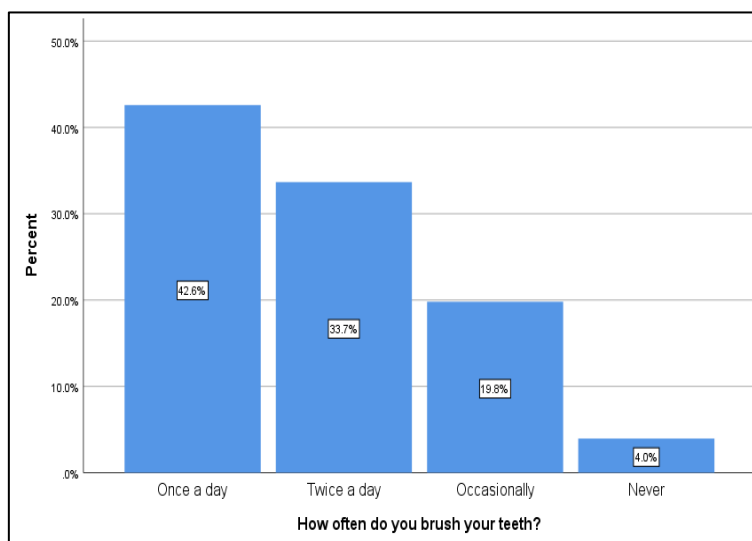


Figure 1. Frequency of tooth-brushing habits among pregnant women

As shown in (Figure 2), among pregnant women, the most commonly used oral hygiene aid was toothpaste containing fluoride or chlorhexidine (95%), followed by mouthwash (33%). Only a small proportion used dental floss (06%) or Miswak (1%). These results indicate that while most pregnant women adopt basic oral hygiene practices, the use of adjunctive aids such as dental floss or traditional tools like Miswak is limited, emphasizing the need for education on comprehensive oral care during pregnancy.

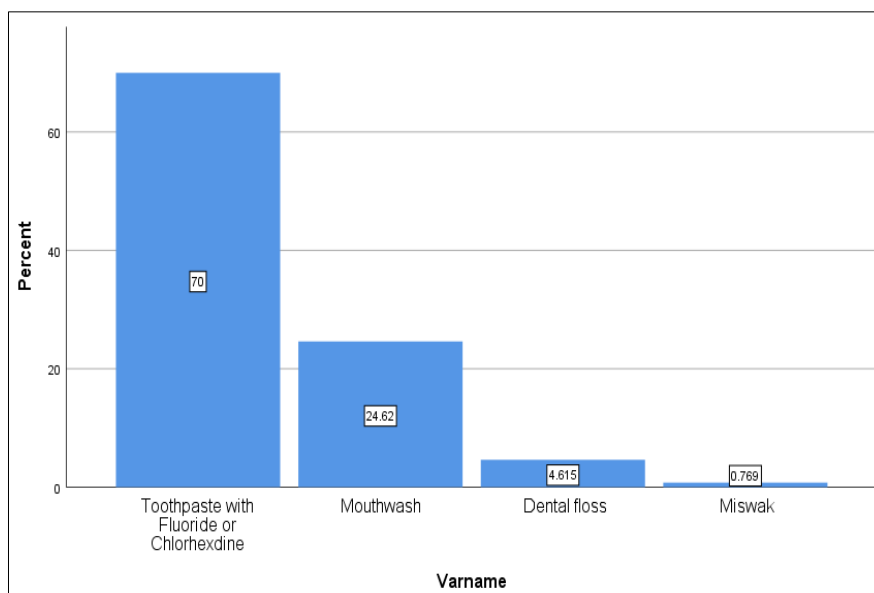


Figure 2. Use of oral hygiene aids among pregnant women (multiple responses)

As shown in (Figure 3), approximately 66% of the pregnant women reported that they visited a dentist during their pregnancy, whereas 34% had not. This result indicated that while a majority of participants sought professional dental care, a substantial proportion of pregnant women did not receive dental check-ups, and they need to promote regular dental visits as part of prenatal care.

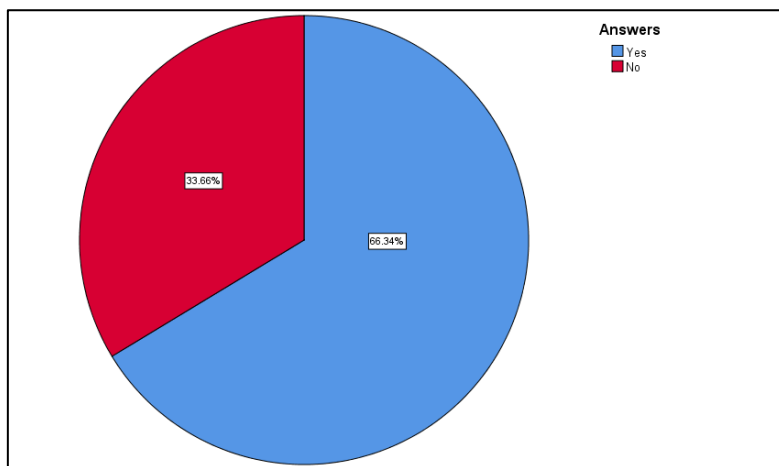


Figure 3. Dental visits among pregnant women during pregnancy

As shown in (Figure 4), among pregnant women who visited a dentist during their pregnancy, the most common reasons were bleeding gums (67%) and toothache (49%). Also, Gum swelling accounted for 36% of visits, while only 2% sought care for tooth decay, and 5% visited due to bad breath. These results suggest that most dental visits during pregnancy were driven by symptomatic oral health issues, particularly gum problems and pain, so there is a need for preventive oral care and awareness programs for expectant mothers.

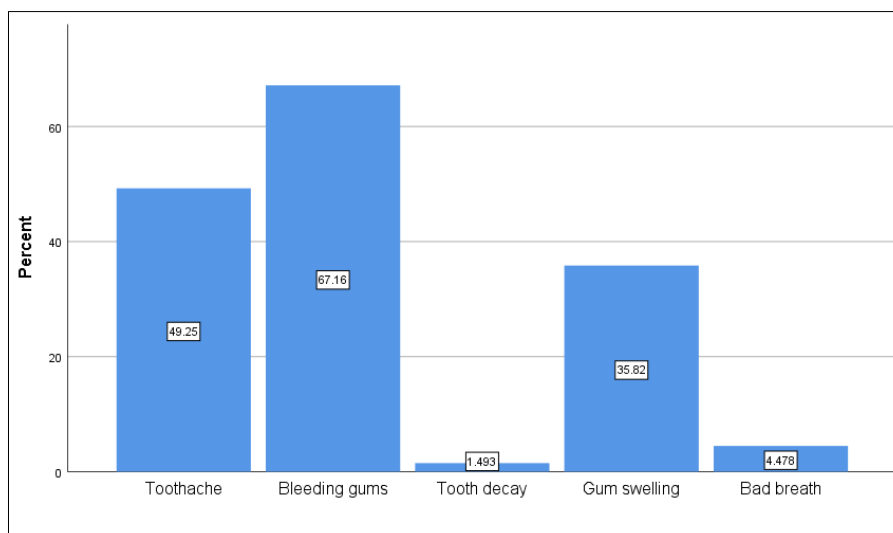


Figure 4. Distribution of reasons for visiting a dentist among pregnant women during pregnancy

As shown in (Figure 5), in the sample of this study, approximately 41% of pregnant women believed that oral health affects pregnancy outcomes. However, about 29% thought it did not, and around 30% were unsure. These results indicate that although a significant proportion of women recognize the importance of oral health during pregnancy, there remains a considerable percentage who are either unaware or uncertain, highlighting the need for educational interventions.

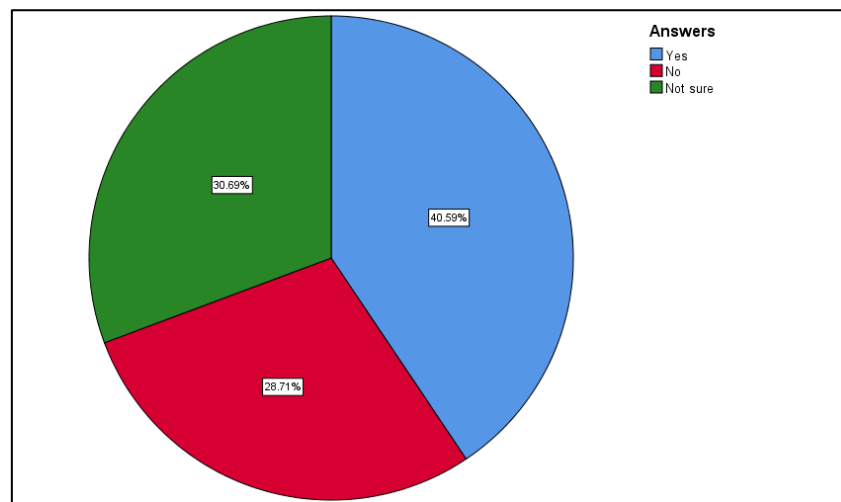


Figure 5. Pregnant women's awareness of the impact of oral health on pregnancy outcomes

As shown in (Figure 6), the participants reported that they get health information from multiple sources. The majority (57%) relied on the Internet, followed by 38% who received information from doctors, and another 38% from social media. Only a small proportion (9%) obtained information from family or friends. These results indicate that digital platforms, including the Internet and social media, play an important role in disseminating health information among pregnant women. Therefore, women must ensure the accuracy and reliability of online health content.

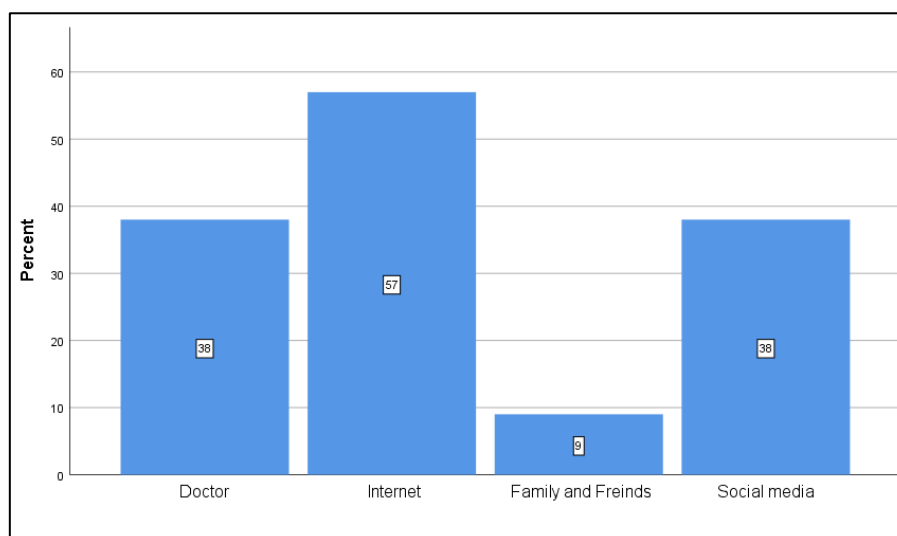


Figure 6. Sources of health information among pregnant women (multiple responses)

As illustrated in (Figure 7), the majority of pregnant women (67%) expressed a desire to receive more information about oral health during pregnancy, while 33% indicated that they did not wish to receive additional information. These findings highlight a strong interest among expectant mothers in enhancing their knowledge about oral hygiene and its impact on pregnancy outcomes, emphasizing the need for educational programs targeting this population.

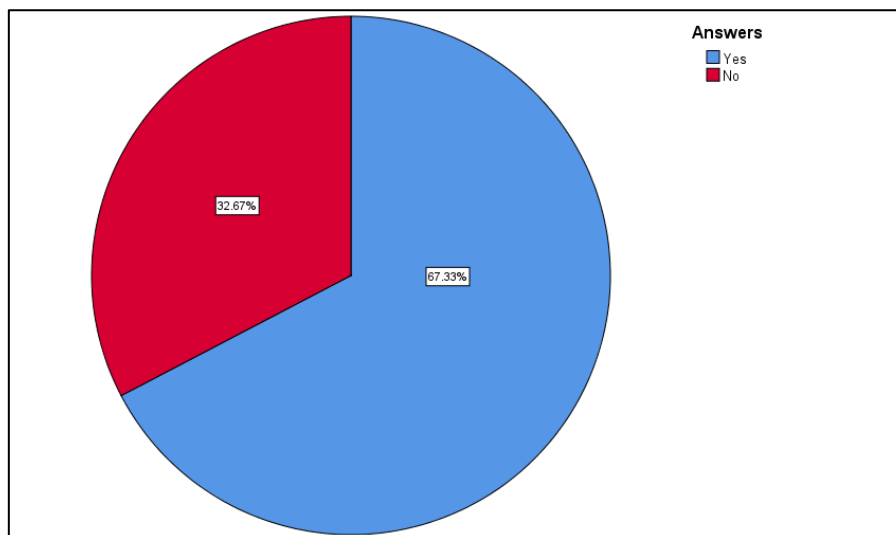


Figure 7. Pregnant women's interest in receiving additional oral health information during pregnancy

As presented in (Figure 8), among pregnant women, about 70% reported experiencing bleeding gums or endodontic toothache during pregnancy, while around 31% experienced bad breath. Additionally, about 25% of participants indicated that they had no oral health issues during pregnancy. These findings demonstrate that a significant proportion of pregnant women encounter oral health problems, particularly gum bleeding and tooth pain, underscoring the importance of preventive oral care and timely dental consultations during pregnancy.

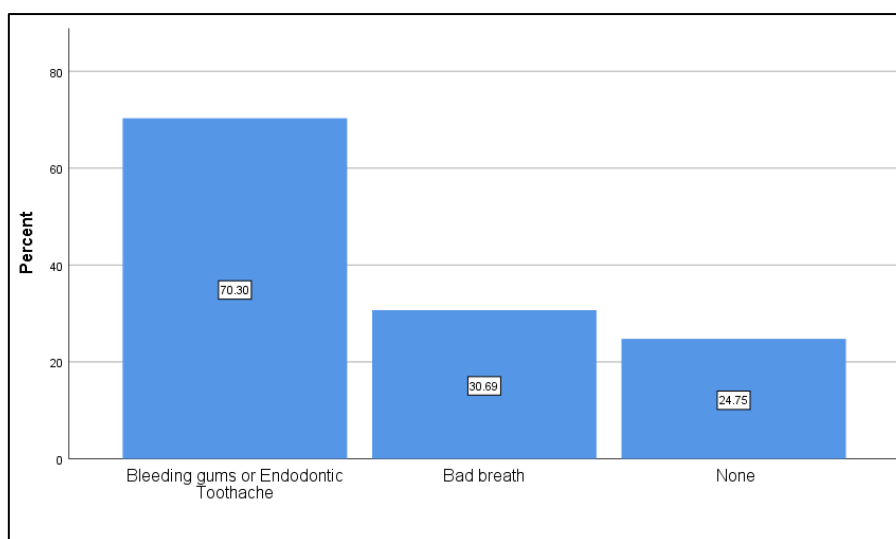


Figure 8. Oral health problems experienced by pregnant women during pregnancy (multiple responses)

As presented in (Figure 9), the percentage of pregnant women in the current study who did not show awareness and showed low oral health awareness based on the oral health awareness score was approximately 25% and about 37%, respectively. 27% of the participants had moderate awareness, whereas about 11% showed high awareness regarding oral health during pregnancy. Overall, the findings show that the majority of the participants had inadequate levels of awareness in oral health, and this calls for targeted educational interventions throughout their pregnancy.

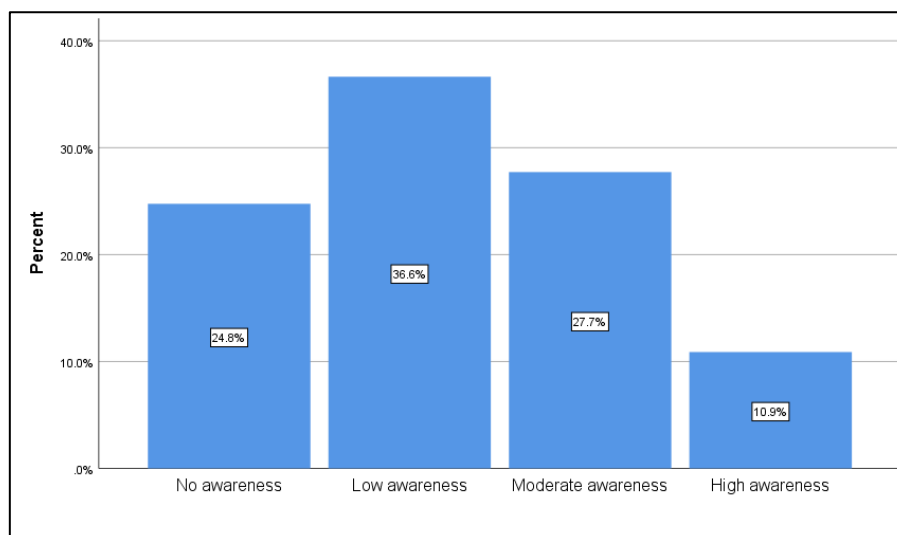


Figure 9. Distribution of oral health awareness levels among pregnant women

Discussion

The present cross-sectional study assessed the awareness and oral health practices among pregnant women attending a primary health care center in Gharyan, Libya. The findings revealed that a considerable proportion of the participants had inadequate levels of awareness regarding oral health during pregnancy, despite the presence of basic oral hygiene practices among many women. Most participants were between 25 and 35 years old, and the majority had a university level of education. Although higher educational levels are usually associated with better health awareness, many women still have limited knowledge about oral health during pregnancy. Similar findings have been reported in previous studies, indicating that pregnant women often lack adequate knowledge regarding the relationship between periodontal disease and pregnancy outcomes [9,14]. Regarding oral hygiene practices, most participants brushed their teeth at least once daily; however, the use of additional aids such as dental floss was very limited. This suggests that although basic oral hygiene practices exist, comprehensive preventive oral care behaviors remain insufficient. Similar observations were made in other studies, where pregnant women relied mainly on tooth brushing while neglecting other important oral hygiene practices [13]. About two-thirds of participants reported visiting a dentist during pregnancy, but most visits were prompted by symptomatic problems such as gum bleeding or toothache rather than routine preventive care. This aligns with previous research showing that pregnant women often seek dental care only when pain or discomfort occurs [11]. Only a minority of participants believed that oral health could affect pregnancy outcomes, while a considerable proportion were uncertain about this relationship. Prior studies have reported a possible association between periodontal disease and adverse pregnancy outcomes, such as preterm birth and low birth weight, emphasizing the importance of improving oral health awareness among pregnant women [12], [15].

Furthermore, the Internet and social media were identified as the primary sources of health information among participants. While these platforms offer accessible means of information dissemination, their reliability may vary significantly. Baig et al. emphasized that reliance on non-professional sources can contribute to misinformation and inadequate health practices [16]. Therefore, healthcare professionals must play a more active role in delivering accurate, evidence-based oral health education during pregnancy.

Notably, the majority of participants expressed a willingness to receive additional information about oral health during pregnancy. This finding reflects a positive attitude toward learning and presents an opportunity for implementing structured educational programs. Previous research has highlighted that incorporating oral health promotion into prenatal care can significantly improve knowledge, attitudes, and practices among pregnant women [8].

Overall, the findings of this study are consistent with previous research conducted in similar populations, confirming that inadequate awareness and suboptimal preventive practices remain widespread among pregnant women [9], [13], [14]. However, this study uniquely demonstrates that such gaps persist even among relatively well-educated populations, emphasizing the importance of targeted and context-specific interventions.

Conclusion

This study highlights insufficient awareness of oral health among pregnant women in Gharyan, Libya, despite the presence of basic oral hygiene practices. Many participants sought dental care only when experiencing symptoms rather than for preventive purposes, and a considerable proportion were unaware of the potential impact of oral health on pregnancy outcomes. These findings emphasize the need to integrate oral health education into routine prenatal care and strengthen the role of healthcare professionals in

providing accurate information and preventive guidance. Improving awareness and preventive practices among pregnant women may contribute to better maternal and fetal health outcomes.

Conflict of interest. Nil

References

1. Mahmood H, Saeed U, Usmani A. Assessment of the oral hygiene practices in pregnant females and their knowledge regarding effect of periodontitis on pregnancy. *Pak Oral Dent J.* 2022 Mar;42(1):25–9.
2. Fathalla M. Women have a right to safe motherhood. *Planned Parenthood Chall.* 1998;1:1–2.
3. Cucó G, Fernández-Ballart J, Sala J, Viladrich C, Iranzo R, Vila J, et al. Dietary patterns and associated lifestyles in preconception, pregnancy and postpartum. *Eur J Clin Nutr.* 2006;60:364–71.
4. George A, Johnson M, Blinkhorn A, Ajwani S, Bhole S, Yeo AE, et al. The oral health status, practices and knowledge of pregnant women in south-western Sydney. *Aust Dent J.* 2013;58:26–33.
5. Paglia L, Colombo S. Perinatal oral health: focus on the mother. *Eur J Paediatr Dent.* 2019 Sep;20(3):209–13.
6. Cianetti S, Lombardo G, Lupatelli E, Rossi G, Abraha I, Pagano S, Paglia L. Dental caries, parents educational level, family income and dental service attendance among children in Italy. *Eur J Paediatr Dent.* 2017 Mar;18(1):15–8.
7. Paglia L, Scaglioni S, Torchia V, De Cosmi V, Moretti M, Marzo G, Giuca MR. Familial and dietary risk factors in early childhood caries. *Eur J Paediatr Dent.* 2016 Jun;17(2):93–7.
8. Phoosuwan N, Bunnatee P, Lundberg PC. Oral health knowledge, literacy and behavior of pregnant women: a qualitative study in a northeastern province of Thailand. *BMC Oral Health.* 2024 Jun;24(1):653.
9. Ishaq Z, Rasul F, Ahmed A. Knowledge, attitude and practices of pregnant females regarding oral health. *BMC Oral Health.* 2024;24.
10. Phoosuwan N, Bunnatee P, Lundberg PC. Oral health knowledge, literacy and behavior of pregnant women. *BMC Oral Health.* 2024;24.
11. Yilmaz F, et al. The effects of pregnancy on oral health, salivary pH and flow rate. *BMC Oral Health.* 2024;24.
12. Ebinghaus M, et al. Assessment of women's needs regarding oral health guidance during pregnancy. *BMC Pregnancy Childbirth.* 2024;24.
13. Lo Giudice R, et al. Oral health and hygiene practices among pregnant women. *J Clin Med.* 2024.
14. Williams TM, et al. Oral health knowledge, perceptions and attitudes of pregnant women in Sub-Saharan Africa: a systematic review. *BMC Oral Health.* 2025.
15. Ahmed S, et al. Challenges in oral health referral during pregnancy. *BMC Oral Health.* 2025.
16. Baig MI, et al. Oral health awareness among pregnant women: a cross-sectional study. *Int J Pharm Res Technol.* 2025.