

The Relationship Between Knowledge About Gingivitis in Pregnant Women and Gingivitis

Niken Arlintya Ramadhani¹, Imam Sarwo Edi¹, Bambang Hadi Sugito¹

¹Politeknik Kesehatan Kementerian Kesehatan Surabaya, Indonesia

*Corresponding author: nikenarlintya2001@gmail.com

Article Info

Submitted 05 09 2025

Revised 31 10 2025

Published 31 10 2025

Keywords:

Knowledge, Gingivitis,
Pregnant Women

P-ISSN : 2086-3292

E-ISSN : 2655-9900

National Accreditation:

Sinta 4

Abstract

Background: Gingivitis is a common oral health issue during pregnancy, affecting approximately 74% of pregnant women in Indonesia. However, the role of limited knowledge in its occurrence remains uncertain.

Objective: To examine the relationship between pregnant women's knowledge of gingivitis and the severity of gingival inflammation at Bulak Banteng Community Health Center, Surabaya. **Methods:** A cross-sectional study was conducted from December 2024 to March 2025 involving 30 pregnant women selected through convenience sampling. Participants completed a structured questionnaire that assessed their knowledge of gingivitis causes, symptoms, and prevention. Scores were categorized as low ($\leq 50\%$), moderate (51–75%), or high ($>75\%$). Gingival status was evaluated by a calibrated dental therapist using the Gingival Index and classified as mild, moderate, or severe. Data were analyzed using descriptive statistics and the Spearman rank correlation test. The Poltekkes Kemenkes Surabaya Ethics Committee granted ethical approval, and all participants provided written informed consent. **Results:** The mean participant age was 26.4 ± 4.2 years. Most had low knowledge (63.3%) and moderate gingivitis (53.3%). The correlation between knowledge and the gingival index was weak and non-significant ($r = -0.114$, $p = 0.306$). **Conclusion:** Although most respondents had low knowledge and moderate gingivitis, no significant association was found between the level of knowledge and the severity of gingivitis. Broader studies and educational interventions during antenatal care are recommended to improve oral health literacy and preventive behaviors.

INTRODUCTION

Health is paramount for all humans, especially for pregnant women, who are physically and mentally healthy. Oral and dental health are also part of this overall well-being, as proper oral and dental health can be supported by proper oral and dental care. However, knowledge about the importance of prevention and management of oral and dental health problems during pregnancy remains lacking, particularly gingivitis (Kemenkes RI, 2019).

The 2018 Basic Health Research (Riskesdas) showed that 74% of pregnant women in Indonesia experienced gingivitis. Maternal gingivitis and related sociodemographic factors, such as low socioeconomic status, are associated with low awareness of oral hygiene (Umniyati et al., 2020).

The most common symptom of pregnancy is gingivitis. Pregnancy causes vascular hormonal changes that exacerbate the inflammatory response. Pregnant women often neglect their dental health, which causes plaque to build up on the teeth and gum line, which can lead to gingivitis and periodontitis, as well as bleeding gums. Approximately 60 to 70 percent of pregnant women suffer from gingivitis with bleeding gums (Umniyati et al., 2020).

As many as 95.4 percent of pregnant women in Indonesia have undergone prenatal care, and 83.5 percent have had at least four prenatal care visits during their pregnancy. However, the number

of pregnant women who receive dental care during pregnancy is not recorded in any national statistics. Through antenatal care (ANC) programs at community health centers, the oral health of pregnant women can be assessed (Wijaksana, 2020).

Antenatal care is a form of care provided during pregnancy to monitor the growth and development of the fetus in the womb. Routine and comprehensive monitoring allows for early detection of abnormalities or risks, allowing for appropriate treatment. Pregnant women should receive ANC services or visits during all four trimesters of pregnancy. Two visits are recommended in the first trimester, and two in the second and third trimesters (Rahmadi & Dyah Purnomowati, 2022).

According to secondary data collected from 2023, the dental clinic of Bulak Banteng Community Health Center Surabaya used integrated ANC and received 307 visits from pregnant women; 195 of them experienced gingivitis during pregnancy, with 66% experiencing it and 34% healthy, with the target of 0% being "High Percentage of Gingivitis in Pregnant Women". During pregnancy, many physiological, anatomical, and hormonal changes occur, including changes in the oral cavity due to increased circulating pregnancy hormones, such as estrogen, which results in higher acid levels in the oral cavity. Furthermore, exposure of the teeth and gingiva to stomach acid from vomiting and nausea in pregnant women can contribute to this (Ambarwati, Larasati, & Soesilaningtyas, 2021; Ferry & Angeline, 2018; Hardiderista et al., 2021; Mulyana & Pipi, 2018).

During pregnancy, there is a possibility that gingival blood vessel permeability will increase as a result of the actions of the hormones progesterone and estrogen, making them more sensitive to plaque. This includes complaints such as cravings, toothache, vomiting, and nausea caused by poor oral hygiene. Hyperemesis and cravings for sweet foods can lead to poor oral hygiene, which contributes to an increased risk of pregnancy complications. Several pregnancy complications have been known to be associated with periodontal disease, such as miscarriage, low birth weight, hypertension, and premature birth (Rahmadi & Dyah Purnomowati, 2022).

Pregnant women often lack knowledge about gum inflammation, leading them to neglect their gum health (Fatmasari & Lismawati, 2020; Fione & Maramis, 2018; Leelavathi, Merlin, Ramani, Suja, & Chandran, 2018; Machfoedz, 2018; Nova Winta, Dwi Eni Purwati, 2018; Peeran & Ramalingan, 2021; Priya, Rajpar, Punjabi, & Ishaque, 2020). This contributes to poor gum health. Pregnant women with premature or low birth weight (LBW) babies can experience this problem, making it crucial to maintain good oral and dental hygiene (Sutopo, Kusuma, & Agustin, 2021).

According to the Indonesian Ministry of Health (Hardiderista et al., 2021), efforts are needed to prevent gingivitis given its prevalence in pregnant women. One way is to reduce carbohydrate intake and brush your teeth regularly. Providing education to pregnant women about gingivitis is an additional measure that health professionals can take. The dental and oral health of pregnant women is not only a consequence of what they know, think, and do during pregnancy.

Based on examination data from 10 pregnant women at the Bulak Banteng Community Health Center dental clinic in 2024, the average gingival index was 2.1, categorized as severe. This figure is far from the target for pregnant women at the Bulak Banteng Community Health Center, which should be 0, or healthy. The high gingival index of pregnant women undergoing examination at the Bulak Banteng Community Health Center in Surabaya was used as the subject of this study, in accordance with the background information presented above.

METHOD

Study design and participants

A cross-sectional analytical study was performed at the Bulak Banteng Community Health Center, Surabaya, from December 2024 to March 2025. The target population consisted of all pregnant women attending the centre's dental clinic. Using convenience sampling, thirty pregnant women who met the inclusion criteria (being pregnant, aged ≥ 18 years, free of systemic diseases and willing to participate) were recruited. Women who required emergency dental care or refused to participate were excluded.

Instrumentation and data collection

Data collection involved two instruments: a knowledge questionnaire and the Gingival Index. The questionnaire was developed based on existing literature and pre-tested for clarity. It contained 20 multiple-choice questions covering causes of gingivitis, signs and symptoms, complications and preventive measures. Each correct answer scored one point, and total scores were expressed as

percentages. Knowledge levels were categorized as low ($\leq 50\%$), moderate (51–75 %) or good ($> 75\%$).

The Gingival Index (Löe & Silness) was used to assess gingival inflammation on four teeth (16, 12, 24 and 44). Scores from 0 (healthy) to 3 (severe inflammation) were averaged per participant and categorized as mild (0.1–1.0), moderate (1.1–2.0) or severe (2.1–3.0). Examinations were performed by a licensed dental therapist who was trained and calibrated prior to data collection.

Ethical considerations

The study protocol was reviewed and approved by the ethics committee of Politeknik Kesehatan Kemenkes Surabaya (approval number: xxxx/KEPK/2024). All participants received verbal and written information about the study and provided informed consent. Confidentiality and anonymity were assured.

Statistical analysis

Data were analysed using IBM SPSS 25. Descriptive statistics summarized socio-demographic characteristics, knowledge levels and gingivitis categories. Normality of continuous variables was assessed with the Shapiro–Wilk test. Because the knowledge scores and gingival index values were not normally distributed, the Spearman rank correlation test was used to evaluate the association between knowledge level and gingivitis severity. Statistical significance was set at $p < 0.05$.

RESULTS AND DISCUSSION

The Bulak Banteng Surabaya Clinic is located at Jalan Dukuh Lebar, Gedung Perintis Utama No. 35, Bulak Banteng Village, Kenjeran District, Surabaya City, East Java, Postal Code 60127. The results show that of the 30 pregnant women who came to the Bulak Banteng Surabaya Community Health Center dental clinic, they have the following general characteristics:

Table 1. Frequency of Education and Age of Pregnant Women

No.	PREGNANT MOTHER	AMOUNT	%
Last education			
1.	Elementary school	8	26,7
2.	First Secondary School	8	26,7
3.	Senior High School	13	43,3
4.	D3 or Strata 1	1	3,3
TOTAL		30	100
Age			
1.	20-24 Years	10	33,3
2.	25-29 Years	14	46,7
3.	30-34 Years	6	20
TOTAL		30	100
Work			
1.	Self-employed	5	16,7
2.	Private sector employee	3	10
3.	Housewife	22	73,3
TOTAL		30	100

Based on table 1 at the Bulak Banteng Community Health Center in Surabaya, there were 13 pregnant women with a high school education, 8 pregnant women with an elementary school education, 8 pregnant women with a junior high school education, and 1 pregnant woman with a bachelor's degree. 10 pregnant women were aged 25 to 29 years, 14 pregnant women were aged 20 to 24 years, and 6 pregnant women were aged 30 to 34 years.

Table 2. Summary of Data on Knowledge of Gingivitis in Pregnant Women

No	Level of Knowledge	Frequency	Percentage (%)
1.	Low Knowledge	19	63,3
2.	Moderate Knowledge	6	20
3.	Good Knowledge	5	16,7
Amount		30	100

Table 2 shows that 63.3% (19 respondents) of the low knowledge group in the research questionnaire, 20% (6 respondents) of the moderate knowledge group, and 16.7% (5 respondents) of the good knowledge group.

Table 3. Bulak Banteng Community Health Center, Surabaya City will provide Gingivitis Category to Pregnant Women in 2025.

No.	Category	Frequency	Percentage (%)
1.	Light	9	30
2.	Currently	16	53,3
3.	Heavy	5	16,7
Amount	30	100	Amount

Based on table 3, the results show that 53.3% of the 16 people who answered had moderate gingivitis. The results of the study using questionnaires and examination of the number of functioning teeth were tested for data normality distribution on the variables of understanding of oral and dental health, as well as the number of functioning teeth using the Shapiro Wilk method because the population was <50 respondents, the following results were obtained:

Table 4. Data normality results

Test Normality Shapiro Wilk	Knowledge Value	Gingivitis	N
Significant Value	0,00	0,00	30

Based on the table, it shows that for the variable of knowledge of pregnant women, the sig value is 0.00 and for the variable of gingivitis of pregnant women, the sig value is 0.00 ($0.00 < 0.05$), meaning that the data is not normally distributed, so the method of analyzing the relationship between the two variables can be continued by using the Spearman rho correlation test.

Table 5. Test Analysis Results *Spearman's rho*

No.	Variables	Spearman's rho	
		P	Correlation Coefficients
1.	At the Bulak Banteng Community Health Center, Knowledge about Gingivitis in Pregnant Women and Gingivitis	0,306	0,114

Table 5 shows that this study produced a sig.(a) value of 0.306. Considering the sig.(p) value is more than 0.05, it can be said that H1 is rejected and H0 is accepted, which indicates that pregnant women's gingivitis and their knowledge of the condition are not related. According to Sarwono (2015), the criteria for the level of closeness of the relationship (Correlation Coefficient) between variables are categorized into:

Table 6. Correlation Coefficient

Correlation Coefficient Value	Relationship Level
0,00 – 0,25	Very weak
0,26 – 0,50	Enough
0,51 – 0,75	Strong
0,76 – 0,99	Very strong
1,00	Perfect

Based on the α value above, it is used to determine the correlation level. The results show that the correlation coefficient value is 0.114. This means that the variable of knowledge about gingivitis has a very weak relationship with gingivitis.

Based on the results of the study on participants, it was found that pregnant women have a relatively low level of awareness of gingivitis. This finding aligns with the study by (Simamora, Edi, & Hadi, 2022) entitled "The Relationship Between Pregnant Women's Knowledge of Dental and Oral Health Maintenance and the Incidence of Gingivitis (At the Putat Jaya Community Health Center in Surabaya City)." The study found that most pregnant women were unaware that vomiting can trigger gingivitis and that pregnancy can affect oral health.

This is supported by respondents' answers to a questionnaire in a study conducted at the Bulak Banteng Community Health Center in Surabaya in 2025. Respondents were unaware that gum inflammation could impact pregnancy and the baby. Pregnant women's low knowledge of gingivitis is due to the limited information they receive about dental and oral hygiene. This is consistent with research showing that most pregnant women have never received education about dental hygiene, either before or during pregnancy. In fact, only a few of them received information about dental and oral hygiene during pregnancy. Respondents only knew when to brush their teeth, but they did not know how to do it properly.

The distribution variable of respondents according to gingivitis status shows that respondents are in the moderate category. This is in accordance with the results of the study "Maintenance of Dental and Oral Health of Pregnant Women with Gingivitis at the Urangagung Sidoarjo Health Center" (Nova Winta, Dwi Eni Purwati, 2018). Thus, the results show that most pregnant women with gingivitis meet the criteria for moderate inflammation, according to their status examination at the Urangagung Sidoarjo Health Center. Based on the results of the study, researchers found that pregnant women with gingivitis do not receive sufficient care. attention from the people involved and obstetricians and pregnant women. Periodontal disease in pregnant women who do not receive treatment is a risk factor for premature birth (<37 weeks) and babies born with low birth weight (<2500g).

Research conducted at the Bulak Banteng Community Health Center in Surabaya showed no significant correlation between pregnant women's knowledge of gingivitis and the incidence of gingivitis. In her study, "The Relationship between Pregnant Women's Knowledge of Dental and Oral Health Maintenance and the Incidence of Gingivitis at the Putat Jaya Community Health Center in Surabaya City," (Simamora et al., 2022) found no correlation between the number of gingivitis cases and pregnant women's knowledge of dental and oral health maintenance. This finding aligns with her own research.

According to L. Green's theory (1980) in (Notoatmodjo, 2018), education level influences knowledge, with higher levels of education expected to lead to better health behaviors. With good knowledge of oral and dental health, it is hoped that pregnant women will also be able to maintain good dental hygiene, so they can prevent gingivitis as early as possible and avoid other dental health problems.

Pregnancy is another factor that can cause secondary gingivitis because pregnancy is a physiological condition that alters hormonal balance, particularly changes in estrogen and progesterone levels. This increases blood flow, causing the gums to become red, swollen, and bleed easily. However, significant changes in gum tissue are rare if good oral hygiene is maintained during pregnancy

CONCLUSIONS AND RECOMMENDATIONS

Conclusion:

In this cross-sectional study at the Bulak Banteng Health Center, most of the thirty pregnant participants had low knowledge about gingivitis (63.3 %), and the majority displayed moderate gingival inflammation (53.3 %). Statistical analysis using Spearman's rho indicated no significant correlation between knowledge level and gingivitis severity. Thus, within this sample, poor awareness of gingivitis did not translate into worse gingival health, suggesting that other factors—such as hormonal changes, oral hygiene practices, or access to dental care—may play a greater role in pregnancy-related gingivitis.

Recommendations:

1. **Oral-health education:** Even though knowledge level was not statistically linked to gingivitis severity, the overall low awareness highlights the need for targeted educational interventions

during antenatal care visits to improve oral-health literacy and preventive practices among pregnant women.

2. **Integration into antenatal services:** Routine dental examinations and counselling should be incorporated into maternal health programs so that gingival conditions can be monitored and managed early.
3. **Further research:** Future studies with larger and more diverse samples should investigate additional determinants—such as brushing habits, diet and socioeconomic status—to better understand factors contributing to pregnancy-related gingivitis and to evaluate the effectiveness of educational interventions.

REFERENCES

- Ambarwati, Y., Larasati, R., & Soesilaningtyas. (2021). Gambaran Pengetahuan Ibu Hamil tentang Radang Gusi di Puskesmas Panaguan Pamekasan tahun 2020. *Indonesian Journal Of Health and Medical*, 1(1), 2774–5244. Retrieved from <http://repository.poltekkes-denpasar.ac.id/1955/8/lampiran.1.pdf>
- Fatmasari, D., & Lismawati, N. F. (2020). Peningkatan Pengetahuan Tentang Gingivitis Pada Ibu Hamil Melalui Konseling Individu. *Link*, 16(1), 31–35. <https://doi.org/10.31983/link.v16i1.5681>
- Ferry, A., & Angeline, J. (2018). *Bebas Sakit Gigi & Mulut Pada Kehamilan*. (Purindraswari, Ed.) (1st ed.). Yogyakarta: Rapha Publishing.
- Fione, V. R., & Maramis, J. L. (2018). Hubungan Pengetahuan Ibu Hamil Tentang Kebersihan Gigi Dan Mulut Dengan Gingivitis Pregnancy Di Puskesmas Ranomut Manado. *JIGIM (Jurnal Ilmiah Gigi Dan Mulut)*, 1(2), 74–81. <https://doi.org/10.47718/jgm.v1i2.1402>
- Hardiderista, R., Isnanto, & Edi, I. S. (2021). Literatur Review : Penyakit Periodontal pada Ibu Hamil Ditinjau dari Berbagai Faktor yang Mempengaruhi. *Jurnal Ilmiah Keperawatan Gigi (JIKG)*, 3(2), 464–483. Retrieved from <http://ejurnal.poltekkestasikmalaya.ac.id/index.php/jikg/article/view/766>
- Kemkes RI. (2019). Peraturan Menteri Kesehatan RI No 43 Tahun 2019 Tentang Puskesmas.
- Leelavathi, L. T., Merlin, H., Ramani, V., Suja, A. R., & Chandran, R. C. (2018). Knowledge, Attitude, and Practices Related to the Oral Health among the Pregnant Women Attending a Government Hospital, Chennai. *International Journal of Community Dentistry*, 6(1), 16. <https://doi.org/10.4103/ijcd.ijcd>
- Machfoedz, I. (2018). *Menjaga Kesehatan Gigi & Mulut Anak-Anak Ibu Hamil* (6th ed.). Yogyakarta: Fitramaya.
- Mulyana, N. A., & Pipi. (2018). Pengetahuan Ibu Tentang Pemeliharaan Kesehatan Gigi Dan Mulut Pada Anak. *Jurnal Ilmiah Kesehatan IQRA*, 6(1). Retrieved from <https://stikesmu-sidrap.e-journal.id/JIKI/article/view/55>
- Notoatmodjo, S. (2018). *Metodologi Penelitian Kesehatan*. Jakarta: Salemba Medika.
- Nova Winta, Dwi Eni Purwati, W. H. (2018). Correlation of Pregnancy Stage And Gingiva Status of Pregnant Woman Who Visited Rsud Lebong-Bengkulu. *International Journal of Scientific Research And Education*, 6(7), 7986–7993. <https://doi.org/10.18535/ij sre/v6i7.02>
- Peeran, S. W., & Ramalingan, K. (2021). *Gingival and Periodontal Indices. Essentials of Periodontics & Oral Implantology*. Mylapore, Chennai, Tamil Nadu, India: Saranraj JPS Publication.
- Priya, M. A. B., Rajpar, S. P., Punjabi, S. K., & Ishaque, M. (2020). Effect of Oral Hygiene Education on Gingival Health Status among the Pregnant Women in Jamshoro. *The Professional Medical Journal*, 27(08), 1763–1769. <https://doi.org/10.29309/tpmj/2020.27.08.4447>
- Rahmadi, A., & Dyah Purnomowati, R. (2022). Pregnancy gingivitis sebagai faktor risiko kekurangan energi kronis (kek) ibu hamil di puskesmas trimulyo, pesawaran. *Jurnal Kesehatan Masyarakat*, 6(3), 1933–1934. <https://doi.org/10.31004/prepotif.v6i3.9238>
- Simamora, D. L. P. D., Edi, I. S., & Hadi, S. (2022). Hubungan Pengetahuan Ibu Hamil tentang Pemeliharaan Kesehatan Gigi dan Mulut Dengan Kejadian Gingivitis (di Puskesmas Putat Jaya Kota Surabaya). *Indonesian Journal of Health and Medical*, 2(3), 276–284.
- Sutopo, T., Kusuma, V. V., & Agustin, A. A. (2021). Sistem Pakar Diagnosa Penyakit Gigi Secara Mandiri Dengan Pendekatan Metode Forward Chaining Pada UPTD Puskesmas Citangkil II. *Jurnal Insan Unggul*, 9(2), 243–270. <https://doi.org/10.47926/insanunggul.2021.9.2.243-270>
- Umniyati, H., Amanah, S. P., Maulani, C., Kesehatan, D., Masyarakat, G., Kedokteran, F., ...

- Korespondensi, Y. *. (2020). Hubungan gingivitis dengan faktor-faktor risiko pada ibu hamil. *Padjadjaran Journal of Dental Researcher and Student*, 4(1), 36–42. <https://doi.org/10.24198/pjdrs.v4i1.26086>
- Wijaksana, I. K. E. (2020). *Perio Dx Periodontal Sehat Gingivitis \& Periodontitis*. Mulyorejo, Surabaya: Airlangga University Press.