

Jurnal Info Kesehatan

Vol. 24, No. 2, June 2026, pp. 294-304

P-ISSN 0216-504X, E-ISSN 2620-536X

DOI: [10.31965/infokes.Vol24.Iss2.2354](https://doi.org/10.31965/infokes.Vol24.Iss2.2354)

Journal homepage: <https://jurnal.poltekkeskupang.ac.id/index.php/infokes>



RESEARCH

Open Access

Association between Oral Hygiene Knowledge, Attitudes, and Practices and OHI-S among Pregnant Women: A Cross-Sectional Study

Sadimin^{1a*}, Hermien Nugraheni^{1b}, Diyah Fatmasari^{1c}, Agnes Lia Renata^{1d}, Fitri Kusumasari^{1e}

¹ Department of Dental Health, Health Polytechnic of Semarang, Semarang, Central Java, Indonesia

² Faculty of Health Science, Universidade Dili, Dili, Timor Leste

^a Email address: sadimingolden@gmail.com

^b Email address: hermienprajoga@poltekkes-smg.ac.id

^c Email address: fatmasaridiyah@poltekkes-smg.ac.id

^d Email address: agnesliarenata@gmail.com

^e Email address: donitakusumasari2023@gmail.com

Received: 13 January 2026

Revised: 8 March 2026

Accepted: 31 May 2026

Abstract

Pregnant women are at increased risk of oral health problems, including dental caries and gingivitis. This study aimed to examine the association between oral hygiene knowledge, attitudes, and practices and oral hygiene status among pregnant women attending antenatal care at Sragi Health Center, Pekalongan Regency, Indonesia. A cross-sectional analytical study was conducted among 124 pregnant women selected using accidental sampling. Data on oral health knowledge, attitudes, and practices were collected using a structured questionnaire comprising 10 items per domain. Oral hygiene status was assessed using the Simplified Oral Hygiene Index (OHI-S). Associations between behavioral variables and OHI-S categories (good, moderate, poor) were analyzed using Kendall's Tau-B. Most participants had primary-level education (58%), good knowledge (58%), good attitudes (65%), and poor oral health practices (65%). Most respondents showed a moderate OHI-S status (61%). No significant association was found between educational level and OHI-S ($p = 0.655$). Significant associations were observed between knowledge and OHI-S ($p = 0.017$), attitudes and OHI-S ($p = 0.010$), and practices and OHI-S ($p = 0.032$). Knowledge, attitudes, and practices related to oral health were associated with oral hygiene status among pregnant women, whereas educational level was not significantly associated with OHI-S.

Keywords: Oral Hygiene, OHI-S, Knowledge, Behavior, Pregnant Women.

Corresponding Author:

Sadimin

Dental Health Department, Health Polytechnic of Semarang, Semarang, Central Java, Indonesia

Email: sadimingolden@gmail.com



©The Author(s) 2026. This article is distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License, which permits unrestricted use, distribution, and reproduction in any medium, provided you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made.

1. INTRODUCTION

Oral hygiene is a critical determinant of overall dental health outcomes. Awareness of maintaining dental and oral health needs to be emphasized in every individual to reduce the risk of dental and oral problems. Problems that can arise include cavities, bleeding gums, and brittle teeth (Silva et al., 2017). Optimal health, encompassing both physical and mental well-being, is a fundamental priority for all individuals, including expectant mothers. Maintaining optimal oral health among toddlers and expectant mothers necessitates consistent dental care. It includes monitoring dietary intake, ensuring proper and regular tooth brushing to eliminate plaque and debris, performing professional scaling, and addressing dental decay through fillings or the extraction of non-restorable teeth (Lee & Saha, 2013). The oral health status of an expectant mother has a direct impact on the prenatal environment and the eventual well-being of the fetus. If a pregnant woman suffers from a periodontal infection, she is at risk of giving birth to a baby with a low birth weight and being premature (Silk et al., 2008). During the early stages of gestation, expectant mothers frequently experience lethargy, nausea, and emesis. These conditions contribute to elevated oral acidity, which, when combined with fatigue-induced neglect of oral hygiene, significantly accelerates dental decay. Clinical observations indicate that the prevalence of periodontal disease during pregnancy is remarkably high, ranging from 35% to 100% (Bressane et al., 2011). Gingival inflammation tends to progress incrementally throughout the gestational period. This condition is driven by the proliferation of oral bacteria that occurs in conjunction with elevated progesterone and estrogen levels in pregnant women (Rakchanok et al., 2010).

Bressane et al evaluated the oral health condition of 50 pregnant women. The study recorded an average DMFT score of 10.0, with the 'missing teeth' (M) component being the most prominent at 4.28. Clinical assessments revealed that 62% of the pregnant participants exhibited moderate gingival inflammation, while 64% presented with detectable plaque accumulation. In terms of educational background, the cohort comprised individuals who had completed primary school (10%), those with incomplete primary education (20%), high school graduates (34%), and those who had not finalized their university studies (6%) (Vergnes et al., 2012).

In Indonesia, 57.6% of people have dental and oral problems. According to regional data, 25.9% of individuals in Central Java experience oral health complications. The most common oral diseases in Indonesia are dental caries and periodontal disease. The caries prevalence in Indonesia is 88.8%, and the periodontitis prevalence is 74.1%. It shows that dental and oral health maintenance behavior in Indonesia remains low (Weintraub et al., 2014). Assessment of oral hygiene is essential for determining an individual's dental health status. Typically, this is conducted using a standardized index, which provides a numerical representation of clinical conditions observed during an examination. By quantifying the tooth surface area covered by plaque or calculus, the resulting index offers an objective evaluation of oral cleanliness (Rakchanok et al., 2010; Vasiliauskiene, 2003).

Minarni's (2022) results indicated that dental hygiene maintenance measures for pregnant women at the Taram Community Health Center, Limapuluh Kota Regency, were good, but the dental hygiene index was moderate. According to Kaura (2021), there is a significant association between oral hygiene and gingival health in pregnant women. These findings highlight that improving expectant mothers' knowledge and oral health behaviors is a critical strategy for preventing dental complications throughout pregnancy (Bressane et al., 2011; George et al., 2013). Respondents with a good level of knowledge tend to have good behavior in caring for dental and oral health. mouth during pregnancy (22.2%), while respondents with low knowledge levels predominantly reported poorer dental and oral health care during pregnancy (64.0%) (Hashim, 2012).

This research was conducted within the service area of the Sragi Community Health Center (Puskesmas Sragi) in Pekalongan Regency. This site was specifically selected

because its regional characteristics represent a rural population with limited access to dental health infrastructure. Furthermore, the selection of this location was based on the necessity to evaluate the effectiveness of internal referrals between Maternal and Child Health (MCH/Antenatal Care) services and the dental clinic, which have not yet been optimally integrated. The study aimed to examine the association between oral health knowledge, attitudes, and practices and oral hygiene status (OHI-S) among pregnant women attending antenatal care at Sragi Health Center, Pekalongan Regency.

2. RESEARCH METHOD

A quantitative cross-sectional design was employed, characterized by a single-time observation and simultaneous measurement of all study variables. This research was conducted in Pekalongan Regency, with respondents being pregnant women who visited the Sragi Health Center for pregnancy check-ups, regardless of pregnancy trimester. The study involved 124 pregnant women selected through accidental sampling at Sragi Health Center. Inclusion criteria were pregnant women attending antenatal care services at Sragi Health Center, able to read and write, willing to participate, and able to complete the questionnaire and oral examination. Exclusion criteria included women with systemic diseases affecting oral health, those undergoing orthodontic treatment, women who had received professional dental scaling within the previous 3 months, and participants who were unable to complete the examination. Participants were required to be literate and willing respondents. The research was ethically approved by the Semarang Ministry of Health's Ethics Committee (No. 1056/EA/KEPK/2024).

Data on respondents' characteristics and behavior, including knowledge, attitudes, and actions of pregnant women regarding the maintenance of their dental and oral health, were collected using a questionnaire instrument comprising 10 knowledge items, 10 attitude items, and 10 action items, which had been tested for validity and reliability. Oral hygiene status was evaluated using the Oral Hygiene Index Simplified (OHI-S), a clinical metric that quantifies the cleanliness of the oral cavity. This value is determined by measuring the extent of plaque and calculus coverage on specific tooth surfaces. The final OHI-S score is calculated by summing the Debris Index (DI) and the Calculus Index (CI). Dental hygiene is in good condition if the value is between 0 and 1.2, moderate if the value is between 1.3 and 3.0, and poor if the value is between 3.1 and 6.0 (Vasiliauskiene, 2003). The questionnaire consisted of three domains: knowledge, attitude, and practice regarding oral hygiene during pregnancy, each containing ten items. Knowledge scores ranged from 0–10 and were categorized as good ($\geq 75\%$ correct responses) and poor ($< 75\%$). Attitude and practice scores were categorized using the median score as the cut-off point. The instrument was adapted from previous oral health behavior studies and was assessed for validity using item-total correlation analysis. Reliability testing demonstrated acceptable internal consistency (report actual Cronbach's alpha/KR-20 values).

OHI-S examinations were performed by a trained dental examiner under adequate lighting conditions using sterile mouth mirrors and explorers. Standard infection prevention procedures were followed throughout the examination process. OHI-S was analyzed as an ordinal categorical variable (good, moderate, poor). The analysis was limited to bivariate Kendall's Tau correlation testing; therefore, potential confounding factors such as maternal age, trimester, parity, income, and educational background were not controlled for. Data analysis was carried out univariately, producing a frequency distribution for each variable. Meanwhile, bivariate analysis was conducted to examine the relationships between dental and oral health behavior variables and the level of dental hygiene among pregnant women, using the Kendall Tau correlation test.

3. RESULTS AND DISCUSSION

The univariate data for maternal education and dental health behavior (categorized by knowledge, attitude, and action) are summarized in Table 1.

Table 1. Univariate Frequency Distribution

Variable	Frequency (%)
Educational Level	
High	13
Middle	29
Elementary	58
Pregnant women's knowledge	
Good	58
Poor	42
Pregnant women's attitude	
Good	65
Poor	35
Pregnant women's action	
Good	35
Poor	65
Pregnant women's OHI-S	
Good	16
Moderate	61
Poor	23

From Table 1, it can be seen that the majority of pregnant women have a basic education level (58%). Most pregnant women (58%) have a good level of knowledge about maintaining oral health. Meanwhile, most of their attitudes towards dental and oral health (65%) were in the good category. Most of the actions pregnant women take to maintain dental and oral health fall into the poor category, namely 65%. The majority (61%) of pregnant women have moderate oral hygiene.

Table 2. Cross-tabulation of the educational level of pregnant women, knowledge, attitudes, and actions of pregnant women in oral hygiene care, with the oral hygiene status of pregnant women

Variable	Pregnant women's OHI-S			Amount
	Good (%)	Moderate (%)	Poor (%)	
Educational level				
High	0	100	0	100
Middle	34	33	33	100
Elementary	11	67	22	100
Pregnant women's knowledge	28	61	11	100
Good	0	62	38	100
Poor				
Pregnant women's attitude				
Good	25	65	10	100
Poor	0	55	45	100
Pregnant women's action				
Good	46	36	18	100
Poor	0	75	25	100

The majority of respondents maintained moderate OHI-S scores regardless of other factors: 61% of those with good knowledge, 65% of those with good attitudes, and 75% of those with poor oral health behaviors.

Table 3. The correlation test between the level of education of pregnant women, knowledge, attitudes, and actions of pregnant women in oral hygiene care, and the oral hygiene status of pregnant women

Variable	τ	p-value	Meaning	Odds Ratio
Education level-OHI-S	0.04	0.655	Not significant	1.322
Knowledge-OHI-S	0.22	0.017	Significant	3.844
Attitude-OHI-S	0.20	0.010	Significant	1.221
Action-OHI-S	0.12	0.032	Significant	1.571

Based on the results of the statistical test in Table 3, it was found that behavioral variables significantly influence the oral hygiene status (OHI-S) of pregnant women as a risk factor. Knowledge emerged as the most dominant risk factor with an Odds Ratio (OR) value of 3.844 ($p = 0.017$). This shows that pregnant women with a low level of knowledge about dental health have a 3.844 times greater risk of having a poor OHI-S status compared to those with good knowledge. Theoretically, knowledge is the main foundation for the formation of health behaviors. Without adequate dental health literacy, pregnant women may not understand the urgency of dental care during gestation, which ultimately affects the accumulation of debris and calculus.

Kendall Tau analysis showed a statistically significant association between oral health knowledge and OHI-S status ($p = 0.017$). Pregnant women with greater knowledge tended to have better oral hygiene. Similar findings have been reported in previous studies, indicating that oral health literacy is associated with oral hygiene behavior and clinical oral health outcomes.

Furthermore, the action variable showed an OR of 1.571 ($p = 0.032$), indicating that pregnant women with poor dental care practices were 1.571 times more likely to experience decreased oral hygiene. It aligns with the findings that many respondents still have untimely toothbrushing habits, such as only brushing their teeth after bathing and ignoring the toothbrush before bed. Although attitude also showed a significant association ($p = 0.010$) with an OR of 1.221, the effect was not as large as that of the actual knowledge and action factors.

Education level showed no statistical significance ($p = 0.655$), despite an OR of 1.322. This indicates that formal education in general does not automatically guarantee a specific understanding of dental health. The existence of psychological barriers such as *emesis gravidarum* and the myth that dental care can harm the fetus often makes pregnant women, regardless of their educational background, tend to neglect their oral hygiene. Therefore, the results of this *Odds Ratio* indicate that the most crucial intervention is improving specific, practical dental health literacy to change preventive behaviors during pregnancy.

Expectant mothers frequently encounter various oral health complications during gestation. These issues commonly include ptyalism (excessive salivation), dental caries, gingival bleeding, and gingivitis (Oliveira et al., 2008). Despite their high prevalence, dental problems in pregnancy are often ignored by patients and clinicians alike. Many pregnant women do not disclose oral health concerns during routine check-ups unless they become symptomatic. Consequently, the emphasis on fetal well-being often overshadows the importance of maintaining dental and oral health during pregnancy (Vered & Sgan-Cohen, 2003).

The study revealed no statistically significant correlation between educational attainment and OHI-S scores ($p = 0.655$), suggesting that higher education does not inherently lead to better oral hygiene during pregnancy. Paradoxically, participants with basic and secondary education levels exhibited 'good' OHI-S status more frequently than their more highly educated counterparts. The absence of a significant correlation suggests that general academic achievements do not necessarily encompass practical dental health knowledge. Furthermore, socioeconomic and environmental factors, particularly the scarcity of health infrastructure in rural areas, may overshadow the influence of formal education on health awareness. According to the Theory of Planned Behavior, knowledge alone does not dictate health outcomes. While education informs a person's understanding, factors such as social pressure (subjective norms) and the individual's confidence in their ability to perform the task (perceived behavioral control) are often more vital in determining how well a pregnant woman maintains her oral health (Mahirawatie & Astuti, 2024). Furthermore, psychological changes during pregnancy, such as emesis gravidarum (morning sickness) and lethargy, may cause even highly educated women to neglect their dental care routines.

These factors may contribute to oral hygiene behavior; however, they were not measured in the present study and warrant investigation in future research. Consequently, health literacy is likely a more accurate predictor of OHI-S than the duration of formal education. Therefore, interventions should focus on targeted dental health education rather than general academic improvement.

According to Green in Notoatmodjo (2018), what most influences a person's health are behavioral and non-behavioral factors (Blicher et al., 2005). Behavior itself is formed through a previous educational process that goes through several stages until a pattern of behavior is established (Lwanga & Lemeshow, 1991). Behavior is influenced by three factors: genetic, exogenous, and learning. Genetic factors include behaviors formed within the individual from birth. Exogenous factors include environmental factors, religious education, social factors, and the central nervous system for emotional perception (Dhotre et al., 2018). The learning process is a synergy between heredity and environmental factors in the formation of behavior (Martínez-beneyto et al., 2011). The environment is included in exogenous factors. The environment we live in influences our knowledge and awareness of health. Urban and rural areas, with different conditions, will greatly influence health awareness. One of them is dental and oral health. In rural areas, the availability of basic infrastructure and services remains limited, including clean water, electricity, communication and transportation, and health facilities. There are still many people with low levels of education. Moreover, the motivation to see a doctor remains lacking. In urban areas, transportation and communication facilities are more evenly distributed, making health programs more accessible (WHO, 2020). It shows that indirect education regarding dental and oral health also influences a person's dental and oral health (Loe & Silness, 1963).

Formal education is not the sole determinant of dental health. Instead, oral health outcomes are heavily influenced by behavioral factors, particularly the tendency to neglect consistent hygiene practices (Puertas et al., 2017). The level of education does not affect the OHI-S score because the respondents' education did not include learning about maintaining dental and oral health, leading to a lack of education and attention, or indifference, to the importance of maintaining dental and oral health. Sadimin et al. (2017) state that belief or trust is one of the main components that form attitudes. The present findings contradict those of Bagaray et al. (2016), who argued that educational attainment is a primary determinant of an individual's knowledge base. Bagaray's study suggests a direct correlation where higher levels of education consistently yield superior health knowledge.

The findings reveal that while a majority of pregnant women (58%) possess a generally good understanding of oral health maintenance, significant gaps remain regarding specific practices. A primary concern is the timing of tooth brushing; 61% of participants continue to brush during their morning and evening baths rather than the recommended times after breakfast and before sleep. This behavioral pattern aligns with previous observations where habitual routines often supersede clinical recommendations (Martínez-beneyto et al., 2011). Furthermore, there is a notable lack of awareness of fluoride's protective role in toothpaste for strengthening dental enamel.

Psychological barriers also significantly impact oral health-seeking behavior. Approximately 68% of pregnant women harbor the misconception that dental treatments could potentially harm the fetus, leading to a reluctance to undergo professional examinations (Wandera et al., 2012). This study further demonstrates that superior knowledge directly correlates with better clinical outcomes; 27.8% of women with high knowledge scores achieved a "good" OHI-S category, whereas none of the participants with poor knowledge reached this level of oral hygiene. This disparity underscores that while general knowledge is present, specific health literacy and the debunking of myths are essential to improving actual oral hygiene status during pregnancy.

Knowledge serves as the fundamental basis for decision-making and health-related actions. Knowledge gaps regarding oral hygiene persist among a segment of expectant mothers, directly impacting their health-related practices. This lack of awareness serves as a barrier to effective self-care, ultimately compromising their dental health status. Consequently, maternal knowledge is a critical foundation for the development of behaviors that either promote or hinder oral hygiene (Wandera et al., 2012). Statistical analysis in this research confirms a significant correlation between maternal knowledge and OHI-S status (p -value = 0.017), indicating that women with a greater understanding of oral care tend to maintain higher hygiene levels. These findings are consistent with previous studies by Basuni et al. (2014) and Qomariah & Handayani (2016), which emphasize that health-related knowledge, attitudes, and proactive actions are inextricably linked to clinical oral health indicators. Collectively, these results suggest that enhancing the specific health literacy of pregnant women is essential for improving their OHI-S scores and preventing pregnancy-related dental complications.

Evaluation of maternal attitudes reveals that while a majority of pregnant women (65%) demonstrate a generally positive disposition toward oral health, specific misconceptions persist. For instance, many participants prioritize practicality over clinical timing, preferring to brush their teeth only during baths, and show strong resistance to limiting the consumption of sugary and sticky foods. Furthermore, over half of the respondents (52%) expressed disagreement with the necessity of biannual professional dental cleanings. This study finds that a positive attitude is a key determinant of clinical outcomes: 25% of women with a favorable attitude achieved a "good" OHI-S status, whereas none of those with a poor attitude did. These findings suggest that attitude formation in pregnant women is a complex learning process influenced by personal experience, cultural norms, and significant others. The tendency to prioritize convenience over optimal health practices may stem from adopting or integrating existing social habits. Given that various factors shape these attitudes, it is crucial to implement targeted interventions that address these underlying barriers to foster better health-seeking behaviors (Ababneh et al., 2012; Acharya & Bhat, 2009).

A good attitude influences the intention to participate in activities related to this matter, and a person's attitude is closely related to the knowledge they acquire in the learning process (Acharya & Bhat, 2009; Cornejo et al., 2013). A good attitude in maintaining dental and oral health is a positive response to efforts to maintain oral health.

Attitude is preparation for action. So, when pregnant women know and agree to maintain oral hygiene, if there are inhibiting factors, such as not having time because they are busy caring for household needs, or limited means and facilities, then the mother fails to take action to maintain dental hygiene. It is supported by a theory: namely, that attitude is a conclusion or willingness to act, not a particular motive. Attitude is not yet an action or activity, but a predisposition to action and behavior (Wahyuni & Mariyani, 2022).

Based on the results of the test of the relationship between attitudes and OHI-S numbers, the p -value = 0.010. This shows that there is a relationship between the attitude variable of pregnant women in maintaining oral hygiene and the OHI-S status of pregnant women. There is a relationship between the behavior of pregnant women and oral hygiene (OHI-S) during pregnancy (Cornejo et al., 2013; Pavi et al., 2010)

The study identifies that a significant portion of pregnant women (65%) demonstrate inadequate oral hygiene practices. Key areas of concern include irregular brushing habits, where 35% do not adhere to the recommended twice-daily routine (after breakfast and before bed), and a widespread reluctance to seek professional dental care, with 81% failing to complete the recommended four dental check-ups during pregnancy. Statistical analysis confirms that these actions directly impact clinical outcomes (p -value = 0.032), showing a significant relationship between oral health practices and OHI-S status. Notably, 46% of women who maintained good health actions achieved a "good" OHI-S category, whereas none of those with poor health actions did.

These findings align with previous research indicating that oral hygiene status reflects individual health behaviors (Vogt et al., 2012). Furthermore, the correlation between public health behaviors and oral hygiene levels is well documented, underscoring the importance of proactive maintenance for optimal outcomes (Minarni et al., 2022). However, it is important to acknowledge a limitation in this study: the use of the recall method to measure actions may introduce self-reporting bias. Respondents might provide socially desirable answers that do not fully reflect their actual daily practices, which should be considered when interpreting these results (Petersen et al., 2005; Tonello & Pardi, 2016). The weakness of this research lies in the instrument used to measure pregnant women's actions, which relies on recall. There is a strong possibility of bias because respondents' answers do not reflect reality.

The suboptimal oral health actions observed in this study, particularly the neglect of professional dental visits, may be exacerbated by the physiological and psychological shifts inherent in pregnancy. Hormonal fluctuations, specifically the rise in estrogen and progesterone, increase gingival vascularity and alter the immune response, making pregnant women more susceptible to pregnancy gingivitis. When these biological changes are combined with poor oral hygiene practices, such as irregular brushing or high sugar intake, the risk of progressing to periodontal disease increases significantly.

Furthermore, the low rate of dental check-ups (81% non-compliance) suggests a persistent gap in the integrated antenatal care (ANC) system. Many pregnant women may prioritize obstetric consultations over dental health, potentially due to a lack of cross-referrals between midwives and dental professionals. Addressing these behavioral gaps is crucial, as untreated periodontal infections have been linked to systemic complications, including preterm birth and low birth weight. Therefore, reinforcing "preventive actions" through clinical education is not only vital for maternal oral health but also for improving overall neonatal outcomes.

This study has several limitations. First, the use of accidental sampling at a single health center may limit the generalizability of the findings and introduce selection bias. Second, oral health practices were self-reported and may be affected by recall bias. Third, the analysis was limited to bivariate associations and did not control for potential confounders, including age, parity, trimester of pregnancy, income, and access to dental care.

4. CONCLUSION

Educational level was not significantly associated with OHI-S status among pregnant women attending antenatal care at Sragi Health Center. However, oral health knowledge, attitudes, and practices were significantly associated with oral hygiene status. These findings suggest that strengthening oral health education and promoting appropriate oral hygiene practices may improve oral hygiene among pregnant women. Future studies should include additional determinants such as self-efficacy, socioeconomic factors, and access to dental services.

REFERENCES

- Ababneh, K. T., Mohammad, Z., Abu, F., & Khader, Y. S. (2012). Prevalence and Risk Indicators of Gingivitis and Periodontitis in a Multi-Center Study in North Jordan : A Cross-Sectional Study. *BMC Oral Health*, 12(1), 1. <https://doi.org/10.1186/1472-6831-12-1>
- Acharya, S., & Bhat, P. V. (2009). Oral-Health-Related Quality of Life during Pregnancy. *Spring*, 69(2), 1–2. <https://doi.org/10.1111/j.1752-7325.2008.00104.x>
- Bagaray, F. E., Wowor, V. N. S., & Mintjelungan, C. N. (2016). Perbedaan Efektivitas DHE dengan Media Booklet dan Media Flip Chart terhadap Peningkatan Pengetahuan Kesehatan Gigi dan Mulut Siswa SDN 126 Manado. *Journal E-Gigi (EG)*, 4(2). <https://doi.org/10.35790/eg.4.2.2016.13487>
- Basuni, Cholil, & Putri, D. K. T. (2014). Gambaran Indeks Kebersihan Mulut Berdasarkan Tingkat Pendidikan Masyarakat di Desa Guntung Ujung Kabupaten Banjar. *Dentino Jurnal Kedokteran Gigi*, II(1). <https://www.fkg.ulm.ac.id/id/wp-content/uploads/2016/01/GAMBARAN-INDEKS-KEBERSIHAN-MULUT.pdf>
- Blicher, B., Joshipura, K., & Eke, P. (2005). Validation of self-reported periodontal disease: a systematic review. *Journal of dental research*, 84(10), 881–890. <https://doi.org/10.1177/154405910508401003>
- Bressane, L. B., Xosta, L. N. B. da S., Vieira, J. M. R., & Rebelo, M. A. B. (2011). Oral Health Conditions among Pregnant Women Attended to at A Health Care Center in Manaus, Amazonas, Brazil. *Odonto Cienc*, 26(4), 291–296. <https://journals.sagepub.com/doi/10.1177/154405910508401003>
- Cornejo, C., Rossi, G., Rama, A., Gomez-Gutierrez, N., Alvaredo, G., Squassi, A., & Klemonsks, G. (2013). Oral Health Status and Oral Health-Related Quality of Life in Pregnant Women from Socially Deprived Populations. *Acta Odontológica Latinoamericana*, 26, 68–74. <https://www.scielo.org.ar/pdf/aol/v26n2/v26n2a02.pdf>
- Dhotre, S., Jahagirdar, V., Suryawanshi, N., Davane, M., & Patil, R. (2018). Assessment of Periodontitis and Its Role in Viridans Streptococcal Bacteremia and Infective Endocarditis. *Indian Heart Journal*, 70(2), 225–232. <https://doi.org/10.1016/j.ihj.2017.06.019>
- George, A., Johnson, M., Blinkhorn, A., Ajwani, S., Bhole, S., Yeo, A. E., & Ellis, S. (2013). The Oral Health Status, Practices and Knowledge of Pregnant Women in South-Western Sydney. *Australian Dental Jo*, 58, 26–33. <https://doi.org/10.1111/adj.12024>
- Hashim, R. (2012). Self-Reported Oral Health, Oral Hygiene Habits, and Dental Service Utilization among Pregnant Women in the United Arab Emirates. *International Journal of Dental Hygiene*, 10, 142–146. <https://doi.org/10.1111/j.1601-5037.2011.00531.x>
- Lee, N. M., & Saha, S. (2013). Nausea and Vomiting of Pregnancy. *NIH Public Access*,

- 40(2), 1–27. <https://doi.org/10.1016/j.gtc.2011.03.009>. Nausea
- Loe, H., & Silness, J. (1963). *Periodontal Disease in Pregnancy* (Issue 11). University of Calgary. <https://www.tandfonline.com/doi/abs/10.3109/00016356408993968>
- Lwanga, S. K., & Lemeshow, S. (1991). *Sample Size Determination in Health Studies*. World Health Organization. <https://iris.who.int/items/9c2e5da4-3785-4fec-9dbc-841e4ae0d98c>
- Mahirawatie, I. C., & Astuti, I. G. A. K. (2024). Factors Influencing Pregnant Women 's Intent to Undergo Dental and Oral Examinations during Antenatal Care (K1) Visits. *International Journal of Medical Science and Dental Research Factors*, 07(05), 15–28. <https://www.ijmsdr.org/published%20paper/li1i36/Factors-Influencing-Pregnant-Women's-Intent-to-Undergo-Dental-and-Oral-Examinations-during-Antenatal-Care-K1-Visits.pdf>
- Martínez-beneyto, Y., Vera-delgado, M. V, Pérez, L., & Maurandi, A. (2011). Self-Reported Oral Health and Hygiene Habits, Dental Decay, and Periodontal Condition among Pregnant European Women. *International Journal of Gynecology and Obstetrics*, 114, 18–22. <https://doi.org/10.1016/j.ijgo.2011.03.003>
- Minarni, Z., Faisal, M., & Arnetty. (2022). Oral Dental Health and Hygiene Maintenance for Pregnant Women at Taram Public Health Center in Lima Puluh Kota Regency. *International Journal of Health Science*, 2(3), 199–204. <https://doi.org/10.55606/ijhs.v2i3.956>
- Notoatmodjo, S. (2018). *Metodologi Penelitian Kesehatan*. Jakarta: Rineka Cipta.
- Oliveira, L. B., Sheiham, A., & Bçnecker, M. (2008). Exploring The Association of Dental Caries with Social Factors and Nutritional Status in Brazilian Preschool Children. *European Journal of Oral Sciences*, 116, 37–43. <https://onlinelibrary.wiley.com/doi/10.1111/j.1600-0722.2007.00507.x>
- Pavi, E., Karampli, E., Zavras, D., Dardavesis, T., & Kyriopoulos, J. (2010). Social Determinants of Dental Health Services Utilization of Greek Adults. *Community Dent Health*, 27, 2010. <https://pubmed.ncbi.nlm.nih.gov/21046905/>
- Petersen, P. E., Bourgeois, D., Ogawa, H., Estupinan-day, S., & Ndiaye, C. (2005). The Global Burden of Oral Diseases and Risks to Oral Health. *Bulletin of the World Health Organization*, 022806(05), 661–669. <https://pubmed.ncbi.nlm.nih.gov/16211157/>
- Puertas, A., Magan-fernandez, A., Blanc, V., Revelles, L., Valle, F. O., Pozo, E., León, R., Mesa, F., Puertas, A., Magan-fernandez, A., Blanc, V., Revelles, L., Valle, F. O., Pozo, E., León, R., & Mesa, F. (2017). Association of Periodontitis With Preterm Birth and Low Birth Weight : A Comprehensive Review. *The Journal of Maternal-Fetal & Neonatal Medicine*, 0(0), 000. <https://doi.org/10.1080/14767058.2017.1293023>
- Qomariah, N., & Handayani, O. W. K. (2016). Penggunaan Media COC (Caries On Catalog) dalam Meningkatkan Pengetahuan Ibu tentang Karies Gigi Balita. *Journal of Health Education*, 25(1), 57–60. <https://www.tandfonline.com/doi/full/10.1080/10556699.1994.10603001>
- Rakchanok, N., Amporn, D., Yoshida, Y., Rashid, M. H. O., & Sakamoto, J. (2010). Dental Caries and Gingivitis among Pregnant and Non-Pregnant Women in Chiang Mai, Thailand. *Nagoya Journal*, 43–50. <https://pmc.ncbi.nlm.nih.gov/articles/PMC11254363/>
- Sadimin, W., T., N., H., & Santoso, B. (2017). Faktor-Faktor Penyebab Rampan Karies Pada Siswa Tk Pertiwi Jembungan I Kabupaten Boyolali. *Jurnal Kesehatan Gigi*, 04(1), 38–48. <https://ejournal.poltekkes-smg.ac.id/ojs/index.php/jkg/article/view/2714>
- Silk, H., Douglass, A. B., Douglass, J. M., & Silk, L. (2008). Oral Health During Pregnancy. *The American Family Physician*, 77(8).

- <https://www.aafp.org/afp/2008/0415/p1139>
- Silva, C., Figueiredo, D. A., Gonçalves, C., Rosalem, C., Luis, A., Cantanhede, C., Bárbara, É., Fonseca, A., Carmen, M., & Nogueira, F. (2017). Systemic Alterations and Their Oral Manifestations in Pregnant Women. *Obstetrics and Gynecology Research*, 43(1), 16–22. <https://doi.org/10.1111/jog.13150>
- Tonello, A. S., & Pardi, V. (2016). Assessment of Oral Health Status of Pregnant Women Participating in A Family Health Program in The City of. *Brazilian Journal of Oral Science*, 6(20). <https://periodicos.sbu.unicamp.br/ojs/index.php/bjos/article/view/8642962/0>
- Vasiliauskiene, I. (2003). Oral Health Status of Pregnant Women. *Scientific Articles*, 5(table 1), 57–61. <https://sbdmj.lsmu.lt/032/032-04.pdf>
- Vered, Y., & Sgan-Cohen, H. D. (2003). Self – Perceived and Clinically Diagnosed Dental and Periodontal Health Status Among Young Adults and Their Implications for Epidemiological Surveys. *BMC Oral Health*, 6, 1–6. <https://link.springer.com/article/10.1186/1472-6831-3-3>
- Vergnes, J., Kaminski, M., Lelong, N., Musset, A., Sixou, M., & Nabet, C. (2012). Frequency and Risk Indicators of Tooth Decay among Pregnant Women in France : A Cross-Sectional Analysis. *PLoS ONE*, 7(5). <https://doi.org/10.1371/journal.pone.0033296>
- Vogt, M., Sallum, A. W., Cecatti, J. G., & Morais, S. S. (2012). Factors Associated with The Prevalence of Periodontal Disease in Low-Risk Pregnant Women. *Reproductive Health*, 9(1), 3. <https://doi.org/10.1186/1742-4755-9-3>
- Wahyuni, I. T., & Mariyani. (2022). Relationship between Age and the Event of Chronic Energy Deficiency in Pregnant Mothers. *International Journal of Health Sciences*, 2(3), 119–123. <https://share.google/kDGNVVXyZwPwAG6GI>
- Wandera, M., Åström, A. N., Okullo, I., & Tumwine, J. K. (2012). Determinants of Periodontal Health in Pregnant Women and Association with Infants ' Anthropometric Status : A Prospective Cohort Study from Eastern Uganda. *BMC Pregnancy and Childbirth*, 12(90). <https://link.springer.com/article/10.1186/1471-2393-12-90>
- Weintraub, J. A., Finlayson, T. L., Gansky, S. A., Santo, W., & Ramos-Gomez, F. (2014). Clinically Determined and Self-Reported Dental Caries Status During and After Pregnancy Among Low-Income Hispanic Women. *NIH Public Access*, 73(4), 311–320. <https://doi.org/10.1111/jphd.12029>
- WHO. (2020). *Basic Documents: 49th edition*. Retrieved from https://apps.who.int/gb/bd/pdf_files/Bd_49th-en.pdf