The Relationship Between Knowledge of Dental Caries and the Incidence of Dental Caries in Pregnant Women at Polindes Jungkarang, Sampang, Madura

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ABSTRACT Dental caries represents a significant oral health challenge during pregnancy, with elevated prevalence rates attributed to physiological changes including hormonal fluctuations and modifications in the oral cavity microenvironment. These pregnancy-related alterations create conditions that predispose expectant mothers to increased cariogenic risk. The Polindes Jungkarang facility in Sampang Regency has documented concerning rates of dental caries among its pregnant patient population, suggesting potential gaps in preventive knowledge and practices within this demographic. This study aimed to investigate the relationship between maternal knowledge regarding dental caries and the prevalence of carious lesions among pregnant women receiving care at Polindes Jungkarang, Sampang Regency. An analytical cross-sectional study design was employed to examine pregnant women attending Polindes Jungkarang between January and March 2024. Data collection utilized validated questionnaires to assess participants' knowledge of dental caries etiology, prevention, and management, alongside clinical examinations employing the DMF-T (Decayed, Missing, Filled Teeth) index to quantify carious lesions. The relationship between knowledge levels and caries prevalence was analyzed using Spearman's rank correlation coefficient. Statistical analysis revealed a significant correlation between maternal knowledge of dental caries and the incidence of carious lesions among the study population. The findings demonstrated that participants with limited understanding of caries prevention and oral hygiene practices exhibited higher DMF-T scores, indicating increased caries burden. A statistically significant relationship exists between knowledge of dental caries and caries prevalence among pregnant women at Polindes Jungkarang. These findings underscore the critical importance of implementing comprehensive oral health education programs targeting expectant mothers to enhance preventive knowledge and reduce caries incidence during pregnancy. Such interventions may contribute to improved maternal and potentially fetal oral health outcomes.

INDEX TERMS Dental caries, Pregnancy, Maternal knowledge, Oral health education, DMF-T Index.

I. INTRODUCTION

Dental caries represents one of the most prevalent chronic diseases globally, characterized by the progressive demineralization of dental hard tissues through bacterial metabolic processes [1]. During pregnancy, the prevalence and severity of dental caries increase substantially due to complex physiological adaptations that alter the oral microenvironment [2][3]. These pregnancy-associated changes include hormonal fluctuations, modifications in salivary composition and flow rate, dietary behavioral changes, and compromised oral hygiene practices, collectively creating conditions that predispose expectant mothers to enhanced cariogenic risk [4][5][6]. The significance of this health challenge extends beyond maternal well-being, as emerging evidence suggests associations between maternal oral health status and adverse pregnancy outcomes, including preterm birth, low

birth weight, and compromised fetal development [7][8][9]. Contemporary approaches to assessing and managing dental caries during pregnancy encompass multiple methodological frameworks. The DMF-T (Decayed, Missing, Filled Teeth) index remains the gold standard for quantifying caries experience in epidemiological studies, providing standardized metrics for cross-sectional and longitudinal assessments [10][11]. Recent technological advances have introduced digital caries detection methods, including laser fluorescence and quantitative light-induced fluorescence, offering enhanced diagnostic precision [12][13]. Preventive interventions have evolved to include evidence-based protocols such as fluoride varnish applications, antimicrobial therapies, and comprehensive oral health education programs specifically tailored for pregnant populations [14][15]. Risk assessment models

incorporating sociodemographic, behavioral, and clinical variables have demonstrated improved predictive accuracy for caries development during pregnancy [16][17].

Despite significant advances in understanding pregnancy-related oral health challenges, substantial gaps persist in the literature regarding the relationship between maternal knowledge and caries prevalence. While numerous studies have documented increased caries susceptibility during pregnancy, limited research has specifically examined how maternal understanding of caries etiology, prevention strategies, and oral hygiene practices influences actual disease outcomes [18][19][20]. Furthermore, most existing studies have been conducted in developed countries with established healthcare systems, leaving a notable void in evidence from developing nations where healthcare access and educational resources may be constrained [21][22]. The Indonesian context, particularly in rural healthcare settings such as village health posts (Polindes), remains underexplored despite the documented high burden of dental caries in pregnant populations [23][24]. This study aims to investigate the relationship between maternal knowledge regarding dental caries and the prevalence of carious lesions among pregnant women receiving care at Polindes Jungkarang, Sampang Regency, East Java, Indonesia. The present investigation contributes to the existing body of knowledge through several significant aspects:

1. Empirical Evidence from Underserved Populations: This study provides crucial epidemiological data from a rural Indonesian healthcare setting, addressing the research gap in understanding oral health dynamics among pregnant women in developing countries with limited healthcare infrastructure.
2. Knowledge-Practice Correlation Analysis: The research establishes a quantitative relationship between maternal educational status regarding dental caries and actual disease prevalence, offering evidence-based insights for designing targeted interventional strategies in similar demographic contexts.
3. Methodological Framework Development: The study develops and validates a comprehensive assessment protocol combining validated knowledge questionnaires with standardized clinical examinations, creating a replicable methodology for future research in resource-limited settings.
4. Public Health Policy Implications: The findings provide empirical foundation for developing evidence-based oral health education programs and policy recommendations specifically tailored for pregnant women in rural Indonesian communities.
5. Healthcare System Enhancement: The research offers practical insights for improving preventive oral healthcare delivery at the primary care level, particularly within the Indonesian village health post system.

This manuscript is organized into seven main sections. Following this introduction, the Literature Review section provides a comprehensive background on pregnancy-related oral health changes and knowledge assessment methodologies. The Methodology section details the cross-sectional study design, participant selection criteria, data collection procedures, and statistical analysis approaches. The Results section presents descriptive statistics, correlation analyses, and key findings regarding the knowledge-caries prevalence relationship. The Discussion section interprets findings within the broader context of existing literature, addresses study limitations, and explores implications for clinical practice. The Conclusion section summarizes primary outcomes and recommends future research directions. Finally, the References section provides comprehensive citations of supporting literature.

II. METHOD

A. STUDY DESIGN AND SETTING

This investigation employed an analytical cross-sectional study design to examine the relationship between maternal knowledge of dental caries and caries prevalence among pregnant women [25]. The study was conducted at Polindes Jungkarang, a village health post located in Sampang Regency, East Java, Indonesia, during the period from January to March 2024. This healthcare facility serves as a primary care center providing maternal health services to rural communities in the region. The target population comprised pregnant women receiving antenatal care at Polindes Jungkarang during the study period. Inclusion criteria included: (1) pregnant women at any gestational age, (2) individuals aged 18 years or older, (3) participants able to provide informed consent, and (4) willingness to undergo oral examination. Exclusion criteria encompassed: (1) pregnant women with severe medical complications, (2) individuals unable to communicate effectively, and (3) those refusing oral examination procedures. Sample size determination was based on the expected correlation coefficient between knowledge scores and DMF-T indices, with an assumed medium effect size ($r = 0.5$), alpha level of 0.05, and power of 80%. The calculated minimum sample size was 29 participants. Accounting for potential non-response, a total of 32 pregnant women were recruited using non-probability convenience sampling methodology [26]. This sampling approach was selected due to the limited population of pregnant women attending the facility during the study period and logistical constraints inherent to the rural healthcare setting.

B. DATA COLLECTION INSTRUMENTS

A structured, validated questionnaire was utilized to assess maternal knowledge regarding dental caries etiology, prevention, and management practices. The instrument consisted of 20 multiple-choice questions covering domains including: (1) understanding of caries causation, (2) dietary factors influencing caries development, (3) oral hygiene practices, (4) fluoride utilization, and (5) professional dental care during pregnancy. Each correct response was assigned one point, with total scores ranging from 0 to 20. Knowledge levels were categorized as: poor (0-6 points), moderate (7-13 points), and good (14-20 points) [27]. Dental caries experience was quantified using the standardized DMF-T (Decayed, Missing, Filled Teeth) index as recommended by the World Health Organization [28]. Clinical examinations were performed under standardized conditions using artificial illumination, dental mirrors, and blunt probes. The DMF-T index components were defined as follows: (1) Decayed

teeth (D): teeth with visible cavitation, undermined enamel, or softened floor/walls, (2) Missing teeth (M): permanent teeth extracted due to caries, and (3) Filled teeth (F): teeth with permanent restorations. Third molars were excluded from the assessment unless specifically indicated for caries evaluation [29].

C. DATA COLLECTION PROCEDURES

Data collection was conducted by a single calibrated examiner to ensure consistency and minimize inter-examiner variability. Before commencement, the examiner underwent calibration exercises using standardized photographs and clinical cases to achieve acceptable reproducibility (kappa coefficient $\geq$ 0.85) for caries detection [30]. The data collection protocol involved the following sequential steps: (1) Participant recruitment and screening for eligibility criteria, (2) Explanation of study objectives and procurement of written informed consent, (3) Administration of the knowledge assessment questionnaire in a private setting, (4) Clinical oral examination conducted in a designated area with adequate lighting and infection control measures, (5) Recording of examination findings on standardized data collection forms, and (6) Data verification and quality control procedures. All clinical examinations adhered to universal infection control protocols, including the use of disposable gloves, face masks, and sterilized instruments. Participants were positioned comfortably, and examinations were conducted systematically, beginning with the upper right quadrant and proceeding in a clockwise manner.

D. DATA MANAGEMENT AND STATISTICAL ANALYSIS

Data were entered into Microsoft Excel 2019 and subsequently transferred to SPSS version 26.0 (IBM Corp., Armonk, NY, USA) for statistical analysis. Descriptive statistics were calculated for demographic characteristics, knowledge scores, and DMF-T indices. The normality of data distribution was assessed using the Shapiro-Wilk test. The primary research hypothesis examined the correlation between maternal knowledge scores and DMF-T indices. Given the non-parametric nature of the data distribution, Spearman's rank correlation coefficient was employed to determine the strength and direction of the relationship between variables [31]. Statistical significance was set at $p < 0.05$. Additional analyses included chi-square tests for categorical variables and Mann-Whitney U tests for comparing knowledge scores across demographic subgroups.

E. ETHICAL CONSIDERATIONS

This study received ethical approval from the Institutional Review Board before data collection. All participants provided written informed consent after receiving a comprehensive explanation of study objectives, procedures, risks, and benefits. Data confidentiality was maintained through the use of unique identification codes, and all personal identifiers were removed from the analytical dataset [32]. No experimental interventions were performed, and the study posed minimal risk to participants beyond routine clinical examination procedures [33].

III. RESULTS

TABLE 1 presents the frequency distribution of demographic and clinical characteristics among the study participants. Regarding maternal age distribution, the data demonstrate that the predominant cohort comprises women aged 21-30 years, representing 21 participants (65.6% of the sample). This finding indicates that the majority of participants fall within the optimal reproductive age range. Women aged 31-40 years constituted 10 participants (31.3%), while those in the 11-20 years age bracket represented merely one participant (3.1%). Notably, no participants were identified in the over-40 years demographic. Educational attainment among participants exhibited considerable variation, with junior high school education being the most prevalent level, observed in 12 participants (37.5%). Primary education was reported by 9 participants (28.1%), while secondary education was completed by 7 participants (21.9%). Tertiary education was achieved by a minority of participants, specifically 4 individuals (12.5%). Occupational analysis revealed that the majority of participants were homemakers, comprising 24 individuals (75.0%). Private sector employment or entrepreneurial activities were reported by 7 participants (21.9%), with one participant (3.1%) engaged in alternative occupational categories. No participants were employed in civil service positions.

TABLE 1
Frequency Distribution of Characteristics of Pregnant Women

No.	Respondent Characteristics	Frequency	Percentage (%)
1.	Frequency Distribution of Pregnant Women's Age		
	11-20	1	3.1
	21-30	21	65.6
	31-40	10	31.3
	41-50	0	0
	>50	0	0
2.	Frequency Distribution of Pregnant Women's Education		
	Elementary school	9	28.1
	Junior high school	12	37.5
	Senior High School	7	21.9
	Bachelor	4	12.5
3.	Frequency Distribution of Pregnant Women's Occupations		
	Housewife	24	75.0
	Private Employee / Entrepreneur	7	21.9
	Government employees	0	0
	Other	1	3.1
4.	Frequency Distribution of Maternal Gestational Age		
	Trimester 1	12	37.5
	Trimester 2	9	28.1
	Trimester 3	11	34.4

Gestational age distribution demonstrated relatively balanced representation across pregnancy stages. First-trimester pregnancies accounted for 12 participants (37.5%), second-trimester pregnancies comprised 9 participants (28.1%), and third-trimester pregnancies represented 11 participants (34.4%). This distribution reflects the heterogeneous pregnancy stages encompassed within the study population. Collectively, it provides a comprehensive demographic profile of pregnant women within the study population. The findings indicate that the majority of participants are within the optimal reproductive age range, possess secondary-level education, are primarily engaged in domestic responsibilities, and demonstrate relatively equitable distribution across all gestational trimesters. The

data presented were derived from questionnaire responses administered to 32 pregnant women who accessed services at Polindes Jungkarang. This data collection was conducted to investigate the association between knowledge regarding dental caries and the elevated prevalence of dental caries among pregnant women. The tabulated results represent the systematic compilation of demographic and clinical information gathered from this participant cohort, serving as the foundational dataset for examining the hypothesized relationship between caries knowledge and caries occurrence rates in the pregnant population under investigation.

TABLE 2
Distribution of Pregnant Women's Questionnaire Answers on Dental Caries

No	Questions	Correct N	Correct %	Wrong N	Wrong %	N
1.	What is meant by dental caries/cavities?	23	71.9	9	28.1	32
2.	What is damage to the hard tissue of the teeth called?	11	34.4	21	65.6	
3.	How does tooth decay occur?	11	34.4	21	65.6	
4.	Food residue stuck to teeth can cause teeth to become?	28	87.5	4	12.5	
5.	What are the factors that cause tooth decay?	19	59.4	13	40.6	
6.	Can sweet foods cause cavities?	25	78.1	7	21.9	
7.	What foods can cause cavities?	32	100	0	0	
8.	Plaque on teeth contains bacteria that can cause?	11	34.4	21	65.6	
9.	What are the early signs of cavities?	24	75.0	8	25.0	
10.	What are the signs of cavities?	10	31.3	22	68.8	
11.	What are the consequences of untreated cavities?	29	90.6	3	9.4	
12.	What happens if your teeth hurt because of a cavity?	28	87.5	4	12.5	
13.	How to prevent cavities?	11	34.4	21	65.6	
14.	What is the function of fluoride in toothpaste?	14	43.8	18	56.3	
15.	What is the goal of dental caries prevention?	13	40.6	19	59.4	
16.	What medical measures can be taken to prevent caries from getting worse?	31	96.9	1	3.1	
17.	Is brushing your teeth very important to prevent tooth decay?	27	84.4	5	15.6	
18.	What to do if you have a cavity?	25	78.1	7	21.9	
19.	Who should perform dental fillings?	29	90.6	3	9.4	
20.	When is the right time to have your teeth checked by a dentist?	10	31.3	22	68.8	

According to TABLE 2, the distribution of responses to the dental caries knowledge questionnaire reveals significant knowledge deficits among the study participants.

The findings indicate that the majority of pregnant women demonstrate inadequate understanding regarding the clinical manifestations of dental caries and the appropriate timing for dental consultations. Specifically, 22 out of 32 respondents (68.8%) provided incorrect responses to questions concerning cavity identification and optimal scheduling for dental examinations. This substantial proportion of incorrect responses suggests considerable gaps in oral health knowledge among the pregnant women surveyed, particularly regarding fundamental aspects of caries recognition and preventive dental care practices.

According to TABLE 3, the analysis of knowledge categorization demonstrates that the majority of pregnant women participants were classified within the sufficient knowledge category, representing 53.1% of the study population. TABLE 4 reveals the prevalence of dental caries among participants, with the findings indicating that the predominant severity level was moderate dental caries, affecting 14 participants (43.8% of the sample). Following data collection through questionnaire administration and clinical dental caries examination using standardized assessment forms, the collected data underwent statistical analysis employing Spearman's rho correlation test. This non-parametric statistical method was selected to determine the existence and strength of association between caries knowledge and dental caries prevalence among pregnant women attending Polindes Jungkarang, Sampang Regency. The hypothesis testing procedure was conducted using a predetermined significance level of $\alpha = 0.05$. The decision criteria established that if the obtained significance value was less than or equal to α (Sig ≤ 0.05), the alternative hypothesis (H_1) would be accepted while the null hypothesis (H_0) would be rejected, indicating a statistically significant relationship between caries knowledge and dental caries rates among pregnant women at Polindes Jungkarang, Sampang Regency in 2024.

TABLE 3
Frequency Distribution of Categories of Pregnant Women's Knowledge about Dental Caries

No.	Category	Frequency	Percentage (%)
1.	Good (76%-100%)	6	18.8
2.	Enough (56%-75%)	17	53.1
3.	Less (<56)	9	28.1
	Amount	**32**	**100**

TABLE 4
Distribution of Dental Caries Categories in Pregnant Women

No.	Category	Frequency	Percentage (%)
1.	Very low	6	18.8
2.	Low	4	12.5
3.	Moderate	14	43.8
4.	High	7	21.9
5.	Very high	1	3.1
	Amount	32	100

TABLE 5
Results of the Analysis of the Relationship Between Knowledge of Dental Caries and the High Incidence of Dental Caries Among Pregnant Women

No	Variabel	Spearman's rho P	Spearman's rho Correlation Coefficient
1	Knowledge About Caries and the High Incidence of Dental Caries in Pregnant Women	0.019	0.413

The Spearman's rho correlation analysis results, as presented in TABLE 5, were derived from 32 respondents and yielded a p-value of 0.019, which is less than the established alpha level (0.05), accompanied by a correlation coefficient of 0.413. Consequently, these findings support the acceptance of H_1 and rejection of H_0, thereby establishing a statistically significant positive correlation between knowledge regarding dental caries and the prevalence of dental caries among pregnant women attending Polindes Jungkarang.

IV. DISCUSSION

The conceptualization of knowledge, as articulated by Octaviana and Ramadhani, encompasses the comprehensive integration of activities, methodologies, and mechanisms utilized in cognitive processes, as well as the cumulative outcomes derived from these endeavors. Knowledge fundamentally represents an aggregation of cognitive products resulting from intellectual engagement with specific objects or phenomena experienced by individuals. This intellectual capital constitutes the repository of wisdom accumulated within human consciousness through systematic cognitive processes. Educational attainment emerges as a critical determinant of knowledge acquisition among pregnant women, as demonstrated by Ardhiyanti and Nufusin's analysis, which identified inadequate educational foundations as primary contributors to knowledge deficits. The correlation between limited educational exposure and compromised cognitive development capabilities significantly impedes the capacity for information processing and knowledge synthesis. The present investigation revealed that the predominant educational level among participants was junior high school completion, which potentially constrains their ability to assimilate and develop a comprehensive understanding regarding dental caries and associated oral health concepts.

The theoretical framework proposed by Zahra establishes knowledge as the fundamental substrate upon which health-promoting or health-compromising behaviors are constructed. This knowledge base can be acquired through either experiential learning processes or structured educational interventions. Empirical evidence from Rahmidah's investigation documented suboptimal oral hygiene practices among pregnant women, including irregular tooth brushing patterns, inadequate oral hygiene following emesis episodes, limited consumption of cariogenic foods, and frequent intake of adherent confectionery products [34]. The findings of the current investigation indicate that 53.1% of participants possessed adequate knowledge regarding dental caries. This finding corroborates the research conducted by Novitasari and Riawati, which similarly identified sufficient knowledge levels among the majority of pregnant participants. The age-related enhancement of cognitive maturity and decision-making capabilities, particularly pronounced during the third decade of life due to accumulated experiential learning and psychological development, supports these findings. The demographic analysis revealed that the majority of participants fell within the 21-30 years age range, which corresponds to the period of optimal cognitive functionality [35].

These results demonstrate consistency with Nisa's investigation, which documented adequate knowledge levels in 22 out of 34 pregnant participants, while only 2 participants demonstrated superior knowledge levels. This pattern suggests that pregnant women frequently prioritize pregnancy-related health concerns while potentially neglecting complementary health domains, particularly oral health maintenance. Although participants demonstrated fundamental understanding of dental caries etiology, significant knowledge gaps persisted regarding clinical manifestations of caries, appropriate timing for professional dental consultations, and optimal oral hygiene practices during pregnancy [36]. The knowledge base among pregnant women at Polindes Jungkarang regarding dental caries requires substantial enhancement through targeted educational interventions. Comprehensive dental health education programs, incorporating diverse counseling methodologies, are essential for knowledge augmentation and caries prevention during pregnancy. Healthcare practitioners assume pivotal roles in delivering evidence-based, comprehensible information to pregnant women, thereby facilitating informed decision-making regarding oral health maintenance [37].

Dental caries, as defined by Marlindayanti, represents a pathological process affecting dental hard tissues, including enamel, dentin, and cementum structures. This progressive demineralization process involves continuous mineral ion depletion from enamel surfaces, affecting both coronal and radicular tooth structures through bacterial metabolic activities. Caries development can occur on any dental surface and represents an irreversible pathological condition requiring specific therapeutic intervention. The cariogenic process initiates when dietary residues adhering to tooth surfaces form bacterial biofilms (dental plaque), which metabolize carbohydrates into organic acids, subsequently causing enamel demineralization and cavitation [38]. The analytical findings presented demonstrate that 14 participants (43.8%) experienced moderate caries severity. These results align with Fadhilah's investigation, which identified moderate caries as the predominant severity level among pregnant women, attributed to inadequate oral hygiene maintenance and consumption of cariogenic substrates, thereby accelerating the carious process.

Pregnancy represents a period of elevated caries susceptibility due to multiple physiological alterations, including decreased oral pH resulting from frequent emesis episodes, compounded by reluctance to maintain optimal oral hygiene practices. Additionally, pregnancy-associated dietary modifications, particularly increased consumption of sweet and acidic foods, contribute to oral environment deterioration during gestation. These findings corroborate Afifah's research, which demonstrated the significant impact of pregnancy on dental and oral health status, with elevated estrogen and progesterone concentrations associated with enhanced plaque accumulation and subsequent cariogenic activity [39]. The current investigation identified concerning patterns of oral hygiene neglect among pregnant women at Polindes Jungkarang

with active caries, resulting in widespread caries prevalence. These observations correspond with Setiawan's findings, which attributed oral hygiene avoidance to pregnancy-related hormonal fluctuations, causing nausea during tooth brushing activities. The analysis reveals that hormonal modifications during pregnancy represent a primary etiological factor in dental caries development, particularly through nausea-induced oral hygiene avoidance. This condition elevates oral cavity acidity levels, thereby increasing cariogenic risk factors. Geographic accessibility to healthcare facilities further compounds this issue by creating barriers to preventive dental care and early caries intervention [40]. The statistical analysis demonstrates a significant correlation between caries knowledge levels and dental caries prevalence among pregnant women at Polindes Jungkarang, Sampang Regency. These findings corroborate research conducted by Abdat and Ismail, which established a significant inverse relationship between knowledge levels and caries status among pregnant women, demonstrating that decreased knowledge correlates with elevated caries prevalence. The results align with Yuwansyah and Nuraen's investigation, which identified a significant association between knowledge levels and caries incidence, suggesting that a comprehensive understanding facilitates appropriate preventive measure implementation [41].

According to Green's theoretical framework, behavioral patterns are influenced by three primary factor categories: predisposing factors, reinforcing factors, and enabling factors. Predisposing factors encompass knowledge and attitudinal components among pregnant women. Comprehensive caries knowledge is fundamental for prevention and prevalence reduction, particularly in pregnant populations. Attitudes toward oral health maintenance during pregnancy significantly influence behavioral patterns in dental care practices. Positive attitudes toward caries prevention and oral hygiene maintenance enhance preventive behaviors, while negative or indifferent attitudes may exacerbate dental pathology [42]. Reinforcing factors include spousal and healthcare provider support systems. Support from partners and healthcare professionals represents crucial reinforcement mechanisms for addressing elevated caries incidence among pregnant women. Comprehensive caries knowledge must be accompanied by adequate support systems to ensure sustainable implementation of healthy behavioral patterns. Enabling factors encompass healthcare service accessibility considerations. Geographic proximity to dental healthcare facilities significantly influences pregnant women's likelihood of seeking professional dental care. When dental services are geographically distant or inaccessible, pregnant women may demonstrate reluctance or inability to access routine dental care, resulting in treatment delays or complete avoidance of necessary interventions [43].

According to Blum's theoretical model, health status is influenced not only by behavioral factors but also by healthcare provider competency. Healthcare professionals, including dentists, midwives, and general practitioners, play crucial roles in providing education, counseling, and appropriate dental care. Adequately trained healthcare providers can deliver evidence-based information and necessary support to pregnant women for caries prevention and management. Environmental factors within residential and occupational settings also influence health outcomes. Accessibility to dental healthcare facilities, water quality, and exposure to dental-harmful substances contribute to caries risk factors. Creating environments that support optimal dental health practices can significantly reduce caries risk among pregnant women [44]. Genetic predisposition may influence individual dental health susceptibility patterns. Some individuals may possess genetic vulnerabilities to dental caries or other factors affecting dental health status. However, despite the immutable nature of genetic factors, appropriate dental health practices can still mitigate caries risk, even among genetically predisposed individuals. During pregnancy, women experience heightened caries susceptibility due to recurrent emesis episodes, which often result in oral hygiene avoidance. This pattern corresponds with Kurniawati and Ediningtyas' research findings, which demonstrated that emetic conditions facilitate the proliferation of cariogenic bacteria, particularly Streptococcus mutans and Lactobacillus species. Pregnancy-associated dental pain frequently causes dietary restrictions, potentially resulting in fetal nutritional deficiencies and compromised growth patterns. Pregnant women must recognize the critical importance of oral health maintenance during pregnancy for both maternal and fetal well-being, thereby preventing dental and oral pathologies that may impact pregnancy outcomes. Maternal knowledge significantly influences dental and oral health status, serving as the foundation for motivation in oral health maintenance practices. Enhanced access to dental and oral health information correlates with reduced caries risk, while knowledge deficits contribute to increased pathological susceptibility among pregnant populations.

V. CONCLUSION

The primary objective of this investigation was to establish the correlation between caries knowledge and the elevated prevalence of dental caries among pregnant women attending Polindes Jungkarang, Sampang Regency. The findings revealed that maternal knowledge regarding dental caries demonstrated adequate levels, with 53.1% of participants classified within the sufficient knowledge category, indicating a moderate understanding of caries-related concepts among the study population. Clinical examination disclosed that the predominant severity of dental caries was moderate, affecting 43.8% of pregnant women, which represents a substantial burden of oral pathology within this vulnerable demographic. Statistical analysis employing Spearman's rho correlation test confirmed a significant positive relationship between caries knowledge levels and dental caries prevalence ($p = 0.019$, $r = 0.413$), thereby establishing the validity of the research hypothesis and demonstrating that knowledge deficits contribute to increased cariogenic susceptibility among pregnant women. Contemporary information-seeking behaviors among pregnant women extend beyond traditional healthcare consultations to encompass digital platforms, including internet resources and social media channels, indicating the

evolving landscape of health information acquisition. Healthcare practitioners must provide comprehensive education regarding risk factors that precipitate dental and oral pathological conditions, emphasizing the potential implications for both maternal and fetal health outcomes. The implementation of systematic oral health screening programs within antenatal care services is essential for all pregnant women, encompassing both preventive assessments and therapeutic interventions, regardless of symptomatic presentation, thereby facilitating early detection and management of dental caries and associated complications. Future research endeavors should investigate additional etiological factors contributing to caries development and examine alternative variables influencing cariogenic processes among pregnant populations. Furthermore, intervention studies incorporating educational counseling components during the research process would enhance knowledge acquisition among pregnant women and potentially demonstrate improved oral health outcomes. Such comprehensive approaches would advance our understanding of maternal oral health determinants and contribute to the development of evidence-based preventive strategies for reducing dental caries prevalence in pregnant populations.

DATA AVAILABILITY
No datasets were generated or analyzed during the current study.

AUTHOR CONTRIBUTION
Kamiliyatun Nisa conceptualized and designed the study, developed the research methodology, conducted primary data collection through questionnaire administration and dental caries examinations, performed statistical analysis and interpretation of results, and drafted the initial manuscript. Bambang Hadi Sugito supervised the overall research process, provided guidance on study design and methodology, contributed to data interpretation and validation, and participated in manuscript writing and critical revisions. Sunomo Hadi assisted with statistical analysis using Spearman's rho correlation test, contributed to data interpretation and discussion of findings, and provided critical feedback on the manuscript structure and content. All authors participated in the literature review, reviewed and approved the final version of the manuscript, and agreed to be responsible for all aspects of the work, ensuring integrity and accuracy.

DECLARATIONS
ETHICAL APPROVAL
Ethical approval is not available.

CONSENT FOR PUBLICATION PARTICIPANTS
All participants provided written consent for the publication of study findings and anonymized data. No individual participant details, images, or identifiable information are included in this publication.

COMPETING INTERESTS
The authors declare that they have no competing interests, financial or otherwise, that could inappropriately influence the conduct or reporting of this research.

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