

The relationship between gender and dental caries status based on the def-t Index among first-grade elementary school students in Denpasar

Hubungan antara jenis kelamin dan status karies gigi berdasarkan Indeks def-t pada siswa kelas satu sekolah dasar di Denpasar

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ABSTRACT

The caries in primary teeth is assessed by def-t index. One factor thought to be associated with caries status is gender, although findings on this are inconsistent. This study employed an observational design with a descriptive quantitative approach. A total of 31 pupils from Class 1B at Saraswati 1 Primary School in Denpasar were selected using purposive sampling. A direct examination of the pupils' primary teeth was carried out by dental health personnel using the 2018 Riskesdas Dental Health Survey form. The caries status among boys was predominantly in the very low category, whereas among girls, the distribution of caries status was more even. The Spearman's test showed a correlation coefficient of $r=0.225$ with $p=0.224$ ($p>0.05$), indicating no significant association between gender and caries status based on the def-t index. It was concluded that there was no significant association between gender and the def-t Index category among Year 1B pupils at Saraswati 1 Primary School in Denpasar. The more dominant factors included children's health behaviours. Furthermore, parents' roles in oral health literacy, supervision of toothbrushing, as well as environmental and economic factors were found to be more decisive in determining children's caries scores than gender.

Keywords: gender, caries status, def-t index

ABSTRAK

Indeks def-t digunakan untuk menilai tingkat keparahan karies pada gigi sulung. Salah satu faktor yang diduga berkaitan dengan status karies adalah jenis kelamin, namun temuan ini tidak konsisten. Penelitian ini menggunakan desain observasional dengan pendekatan kuantitatif deskriptif. Sebanyak 31 siswa kelas 1B SD Saraswati 1 Denpasar dipilih menggunakan teknik *purposive sampling*. Pemeriksaan langsung gigi sulung siswa dilakukan oleh tenaga kesehatan gigi menggunakan formulir Survei Kesehatan Gigi Riskesdas 2018. Tampak status karies pada anak laki-laki sebagian besar adalah kategori sangat rendah, sedangkan pada anak perempuan, distribusi status karies lebih merata. Uji Spearman menunjukkan koefisien korelasi $r=0.225$ dengan $p=0.224$ ($p>0.05$), yang mengindikasikan tidak ada hubungan yang signifikan antara jenis kelamin dan status karies gigi berdasarkan indeks def-t di antara. Disimpulkan bahwa tidak ada hubungan yang signifikan antara jenis kelamin dan kategori Indeks def-t pada anak kelas 1B SD Saraswati 1 Denpasar. Faktor yang lebih dominan meliputi perilaku kesehatan anak. Selain itu, peran orang tua dalam literasi kesehatan mulut, pengawasan menyikat gigi, serta faktor lingkungan dan ekonomi terbukti lebih menentukan dalam menentukan skor karies anak dibandingkan dengan jenis kelamin.

Kata kunci: jenis kelamin, status karies, indeks def-t

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INTRODUCTION

Dental caries remains one of the most prevalent oral health pathologies among the pediatric population.¹ According to the WHO in 2022, the global incidence of pediatric caries reached approximately 514 million cases. Within the Southeast Asian region, countries such as the Philippines and Indonesia exhibit high decay rates.² Based on the 2023 Indonesia Health Survey, the prevalence of dental caries in the school-aged population reached 82.8%, indicating that a vast majority of students have experienced carious lesions.³ Furthermore, according to the 2018 Bali Provincial Basic Health Research data, the prevalence of dental cavities among children aged 5–9 years in Denpasar City was 51.72%.⁴

The def-t index is a measure of dental caries experience in children's primary dentition, quantifying the total number of teeth affected by caries at the individual or group level.⁵ Its main components include 'd' for teeth damaged by active caries, 'e' for teeth indicated for extraction due to severe damage, and 'f' for teeth that have been filled and are in good condition.⁶ This index is specifically applied to young children with primary teeth to assess the severity of caries, where the score determines the severity category.⁵

The incidence of dental caries in children is influenced by many factors, ranging from oral hygiene practices and the consumption of cariogenic foods to sociodemographic factors such as age and gender, all of which can affect the risk of tooth decay and the progression of dental caries.⁷ Epidemiological studies indicate that differences in the prevalence of dental caries can be observed between males and females, and gender is often included as a risk variable in caries epidemiological studies, although the results are not always consistent across all populations.⁸ Some scientific literature suggests that girls have a higher risk of caries than boys due to their generally earlier tooth eruption phase. Earlier eruption causes girls' teeth to be exposed to the acidic oral environment for a longer duration compared

to boys of the same chronological age.⁹

On the other hand, there is a different perspective that highlights behavioral aspects in the relationship between gender and dental caries. Several studies have shown that boys tend to have poorer oral hygiene indices due to lower diligence and compliance in tooth brushing compared to girls, which in turn increases the risk of dental caries.¹⁰ The consumption of cariogenic sugary foods is more prevalent among boys due to outdoor activity patterns that encourage excessive snacking behavior, thereby aggravating dental caries status.¹¹ The inconsistency in research findings regarding which group is more susceptible to dental caries indicates that this relationship is complex and influenced by local demographic factors.¹⁰

Several national studies have found no significant association between gender and the def-t/DMF-T index among preschool and elementary school children, such as a study conducted at State Kindergarten 2 Yogyakarta.¹² Conversely, another study involving fifth- and sixth-grade students at SD 1 Magek showed that girls had a higher risk, with 0–3 carious teeth compared to boys with 0–2 carious teeth, consistent with the theory of earlier tooth eruption in females. The mean DMF-T index was also higher in girls (3.6) than in boys (3.4) in previous studies supporting this pattern.¹³ Dental examinations conducted in Class 1B at SD Saraswati 1 Denpasar may contribute to filling the local data gap in Bali, where national studies rarely focus specifically on the relationship between gender and the def-t index. This study is important for developing gender-based caries prevention strategies in Indonesian elementary schools.

METHOD

The research method used in this study was observational with a quantitative descriptive approach. This study aimed to determine the relationship between gender and caries status based on the def-t index among Class 1B students at SD Saraswati. Data collection was

carried out through direct examination of the students' primary dentition, conducted by dental health personnel using instruments and materials consisting of one set of oral diagnostic instruments, a nierbenken, WHO CPI probe, 70% alcohol, gloves, head cap, tissue, mask, white cloth, flashlight, survey forms, stationery, and waste polybags.

This study was conducted at SD Saraswati 1 Denpasar in December 2025. The study population consisted of 36 students from Class 1B. Sample comprised 31 students selected using a purposive sampling technique. The inclusion criteria included all students who were present and willing to undergo the examination, while the exclusion criteria included students who were absent or unwilling to participate in the examination. The status of primary dental health was recorded using the 2018 Basic Health Research Oral Health Survey form.

RESULT

Tabel 1 Normality test

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Index def-t	0,189	31	0,006	0,868	31	0,001

^aLilliefors Significance Correction

Based on the results of the Kolmogorov-Smirnov and Shapiro-Wilk normality tests on the def-t index variable with a sample size of 31 respondents, the Kolmogorov-Smirnov significance value was 0.006 ($p < 0.05$) and the Shapiro-Wilk significance value was 0.001 ($p < 0.05$). These results indicate that the def-t index data were not normally distributed (Table 1).

Based on the gender distribution table, out of a total of 31 respondents, there were 16 male respondents and 15 female respondents. These results indicate that the gender composition of respondents was relatively balanced, with a higher proportion of males compared to females (Table 2).

Based on the distribution table of def-t index categories among 31 respondents, the majority of respondents were classified in the very low category, comprising 11 respondents. Furthermore, the low category was identified in 6 respondents. The high and very high categories were each found in 5 respondents. Meanwhile, the moderate category represented the smallest group, only 4 respondents (Table 3).

Based on the cross-tabulation results between gender and def-t

Tabel 2 Distribution of gender

	Frequency	Percent	Valid Percent	Cummulative Percent
L	16	51.6	51.6	51.6
P	15	48.4	48.4	100.0
Total	31	100.0	100.0	

Tabel 3 Distribution of category def-t

	Frequency	Percent	Valid Percent	Cummulative Percent
Low	6	19.4	19.4	19.4
Very low	11	35.5	35.5	54.8
Very high	5	16.1	16.1	71.0
Medium	4	12.9	12.9	83.9
High	5	16.1	16.1	100.0
Total	31	100.0	100.0	

Tabel 4 Likelihood ratio test

Gender	Category						Total
	Low	Very low	Very high	Medium	High		
L	Count 4	7	1	0	4		16
	% 25.0%	43.8%	6.3%	0.0%	25.0%		100.0%
P	Count 2	4	4	4	1		15
	% 13.3%	26.7%	26.7%	26.7%	6.7%		100.0%
Total	Count 6	11	5	4	5		31
	% 19.4%	35.5%	16.1%	12.9%	16.1%		100.0%

index categories among 31 respondents, in the male group, the majority of respondents were classified in the very low category, comprising 7 respondents, followed by the low and high categories with 4 respondents each. The very high category was identified in only 1 respondent, while no male respondents were classified in the moderate category.

In the female group, the distribution of def-t index categories tended to be more varied. The very low category was found in 4 respondents, while the moderate and very high categories were also identified in 4 respondents each. The low and high categories were the least frequent among females, consisting of 2 respondents and 1 respondent, respectively (Table 4).

Tabel 5 Uji Spearman

		Jenis Kelamin	Def-t
Spearman's rho	Jenis kelamin	Correlation Coefficient	1.000
		Sig. (2-tailed)	.225
		N	31
	Def-t	Correlation Coefficient	.225
		Sig. (2-tailed)	.224
		N	31

Based on the results of the Spearman correlation test, a correlation coefficient value of 0.225 was obtained between gender and caries status based on the def-t index among Class 1B students at SD Saraswati 1 Denpasar. This value indicates a weak relationship, as it falls within the low correlation range. Furthermore, the significance value of 0.224 (> 0.05) indicates that the relationship was not statistically significant. Therefore, it can be concluded that gender did not have a significant association with caries status based on the def-t index among Class 1B students at SD Saraswati 1 Denpasar (Table 5).

DISCUSSION

These results indicate that there was no significant association between gender and dental caries status based on the def-t index. A study conducted by Amelia et al. reported that the caries index increased twofold in males compared to females. Factors associated with the increased risk among students included knowledge and attitudes related to caries, tooth-brushing habits, dietary patterns associated with caries, as well as the role of health personnel.¹⁴ A study conducted by Hartami regarding the caries index among boys compared to girls at Brawijaya Hospital found that the prevalence of dental caries cases in children aged 3-5 years was associated with high consumption of sugary foods two or more times per day.¹⁵

This study is not consistent with the research by Kurniati et al., which investigated differences in plaque accumulation between boys and girls who are susceptible to caries. The study reported that there was no significant difference in plaque accumulation scores between boys and girls after tooth brushing in front of a mirror.¹⁶ A study conducted by Saeed et al. reported that the caries index was higher in males than in females due to factors such as dietary habits, snack consumption, relatively poor dental plaque status, tooth-brushing practices, socioeconomic conditions, as well as the knowledge and educational level of parents.¹⁷ This study is consistent with the research conducted by Rusmiany et al., which reported that there was no significant association between dental caries and gender.¹⁸ The occurrence of dental caries is associated with parents' insufficient understanding of oral health, as well as inappropriate tooth-brushing methods, timing, and frequency, which may increase the risk of caries among children aged 5-6 years.^{19,20}

For example, a 2023 study conducted by Limpo et al. reported a significant correlation between parental oral health literacy and the frequency of dental caries among preschool children, attributing this relationship to parental influence on tooth-brushing frequency and the consumption of sugary snacks.²¹ Similarly, Parra et al. found that parents with lower awareness regarding childhood caries prevention were less likely to supervise tooth brushing or limit cariogenic snacks, thereby contributing to higher def-t scores among their children.²² However, several recent studies also support the absence of a statistically significant association observed in this study. A 2024 study conducted by Sharma et al. in India found no significant correlation between knowledge scores and the incidence of dental caries among children aged 4-6 years, highlighting the role of environmental factors such as food availability, school environment, and cultural habits.²³ Similarly, Goh and et al demonstrated that although parents may understand general oral hygiene recommendations, children's oral hygiene practices remained inadequate due to inconsistent parental enforcement and children's reluctance to brush their teeth properly without supervision.²⁴

Based on the results of the study conducted among Class 1B stu-

dents at SD Saraswati 1 Denpasar, it can be concluded that there was no significant association between gender and def-t index categories. External factors and the interaction between children's behavior and parental roles were found to have a much greater influence on children's oral health. The high prevalence of caries was more strongly associated with habits of consuming sugary foods, improper tooth brushing techniques, and low parental oral health literacy. Parents with limited understanding of caries prevention tend to inconsistently supervise their children's tooth-brushing activities, which ultimately increases plaque accumulation regardless of whether the child is male or female.

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DAFTAR PUSTAKA

1. Kassebaum NJ, Smith AG, Bernabé E, Fleming TD, Reynolds AE, Vos T, et al. Oral health collaborators. global, regional, and national prevalence, incidence, and disability-adjusted life years for oral conditions for 195 countries, 1990–2015: a systematic analysis for the global burden of diseases, injuries, and risk factors. *J Dent Res* 2015;96(4):380-7.
2. WHO. Global Status Report on Oral Health 2022. World Health Organization; 2022
3. Kementerian Kesehatan RI. Survei Kesehatan Indonesia (SKI) 2023. Jakarta: Kementerian Kesehatan RI; 2023
4. Kementerian Kesehatan RI. Riset Kesehatan Dasar: Riskesdas 2018. Jakarta: Kementerian Kesehatan RI; 2018.
5. Wahyuni S, Hanum NA, Ismayani, Fransisca R. Kejadian karies gigi (def-t) berdasarkan sikap anak di TK Putra II Sukarami Palembang. *J Kesehat Gigi Mulut*. 2022;4(2):67–73.
6. Arsad, Tahir M, Zulkaidah U, Yasin SA, Yulistina, Dirman R. Pemeriksaan indeks DMF-T dan def-t pada kelas 1–6 SDN 8 Pangkajene. *Community Dev J* 2023;4(6):13490–4.
7. Sainuddin, Angki J, Rahmawati S, Bahtiar. Faktor-faktor penyebab terjadinya karies gigi pada siswa sekolah dasar. *Media Kesehatan Gigi* 2023; 22(1), 53–60.
8. Papadaki S, Pilalas I, Kang J. Does gender contribute to any differences in caries and periodontal status in UK children? *Arch Intern Med Res* 2022;5(3): 447-54.
9. Alvarez Larrosa R, Oroná YR, Fabruccini Fager A. Tooth eruption and caries activity: is it a risk factor in adolescents? *Odontostomatol* 2022; 24(39)
10. BaniHani A, Aleassa M, Al Wahadni A, Almelud S. Gender differences in oral health knowledge, practices, and oral health status among schoolchildren. *Int J Dent Hyg* 2020;18(3):273-80.
11. Karmila M. Hubungan antara Indeks Massa Tubuh (IMT) dengan status karies gigi pada anak prasekolah di TK Negeri 2 Yogyakarta [skripsi]. Yogyakarta: Universitas Gadjah Mada; 2023.
12. Warman A, Eniyati E, Ifitri I, Arnetty A. Indeks DMF-T berdasarkan jenis kelamin pada siswa kelas V dan VI SD. *Menara Medika*. 2023;6(1):19-27.
13. Suzana A, Gustina E, Rahutami S. Faktor-faktor yang mempengaruhi kejadian karies gigi pada anak sekolah di SD Islamiyah Kecamatan Sekayu Tahun 2024. *Jurnal Akademika Baiturrahim Jambi* 2024;13(2):417-26
14. Hartami E, Rachmawati YL, Puspitasari A, Herlambang AN. Differences in caries severity based on sociodemographic factors in pediatric patients at Universitas Brawijaya Hospital. *Dentika Dent J* 2024;27(1):1–5
15. Pamewa K, Febriyanti M, Wijaya MF, Anas R, Saman MSA. Perbedaan akumulasi plak antara anak laki-laki dan perempuan setelah menyikat gigi di depan cermin. *Indonesian J Publ Health* 2024; 2(2):327-35. E-ISSN 2986-6138, P-ISSN 2987-4629.
16. Bashirian S, Shirahmadi S, Seyedzadeh-Sabounchi S, Soltanian AR, Karimi-shahanjarini A, Vahdatinia F. Association of caries experience and dental plaque with sociodemographic characteristics in elementary school-aged children: a cross-sectional study. *BMC Oral Health* 2018;18(1):7
17. Rusmiani P, Rahina Y, Nurdevianti NN, Idaryati NP. Distribution of dental caries in preschool children based on the dmf-T index and gender. *Interdental Jurnal Kedokteran Gigi* 2025;21(3):374-9. doi:10.46862/interdental.v21i3.12615.
18. Mukaromah S, Subagyo ZT. Tingkat pengetahuan orang tua tentang perawatan kebersihan mulut dengan terjadinya karies gigi pada anak usia prasekolah. *Jurnal Kedokteran Gigi Terpadu*. 2023;5(1):32-6.
19. Vani AS, Sugito BH, Marjianto A. Hubungan pengetahuan orang tua tentang cara menyikat gigi dengan karies gigi pada anak PAUD Widya Tama Gresik. *J Kesehat Gigi Mulut*. 2025;7(2).
20. Limpo P, Gani A, Tedjosasongko U. Influence of parental knowledge on early childhood caries (ECC). *BMC Oral Health*. 2023;23(1):412.
21. Parra R, Martínez-Sanz M, Pérez-Gómez B. Caregiver awareness and caries prevalence in early childhood. *Clin Oral Investig* 2022;26(4):3541-9.
22. Sharma A, Malhotra R, Grover V, Singh S. Knowledge and caries in preschool children: a cross-sectional assessment of parental oral health literacy. *Indian J Dent Res* 2024;35(1):45-51.
23. Goh J, Zheng M, Thomson WM. Knowledge-practice gap in child oral hygiene among parents of preschool children. *Commun Dent Health* 2021;38(2): 114-9.