



ORIGINAL ARTICLE

# The association of caries severity with children's quality of life at at Bersama Ceria Kindergarten, Delitua

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## ABSTRACT

Oral and dental health is a component of overall health that can significantly impact a child's quality of life. Dental caries is a major oral health problem among preschool children. This study aimed to determine the relationship between the severity of dental caries and the quality of life of children attending TK Bersama Ceria Delitua kindergarten. This analytical survey employed a cross-sectional design. The study population consisted of all children enrolled. A sample size of 30 participants was selected using purposive sampling. Data collection was conducted through questionnaires and dental examinations. Data analysis was performed using Spearman's rank correlation coefficient. The mean decay (d) score was  $5.47 \pm 2.474$ , the mean extraction (e) score was  $0.80 \pm 1.064$ , and the mean filling (f) score was  $0.13 \pm 0.434$ . The overall mean def-t score was  $6.40 \pm 2.908$ . The mean child quality of life, as measured by the Early Childhood Oral Health Impact Scale (ECOHIS), was  $46.43 \pm 7.873$ . Spearman's correlation analysis revealed a significant positive correlation between the severity of dental caries and children's quality of life ( $p = 0.003$ ;  $r = 0.521$ ), indicating a strong relationship. The study concludes that a higher def-t score is associated with a poorer quality of life in children.

**Keywords:** quality of life, caries severity, ECOHIS, def-t

## Introduction

Oral health is integral to overall health and significantly influences quality of life, encompassing a child's ability to engage in normal daily activities.<sup>2,3</sup> Dental caries is a prevalent oral health issue across all demographics, particularly affecting children.<sup>4</sup> Currently, dental caries represents a major oral health concern among preschool children in Indonesia, posing a severe problem in early childhood. World Health Organization (WHO) data indicates that Indonesia has one of the highest rates of dental caries in children aged 3-5 years, reaching 90.05%.<sup>5</sup> The 2018 Basic Health Research (Riskesdas) data reveal that the prevalence of caries in children aged 3-4 years is 81.1%, and in those aged 5-9 years, it is 92.6%. Children aged 5 years with a caries severity index (def-t > 6) are classified as having severe early childhood caries (SECC).<sup>6</sup>

Dental caries is an infectious disease characterised by the destruction of tooth tissues, progressing from the outermost enamel layer to the innermost pulp.<sup>2</sup> Young children often act on impulse, exploring various food flavours, which can detrimentally affect their dental health if preventive measures are not taken.<sup>7</sup>

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Dental caries in early childhood can impair quality of life and disrupt daily activities due to compromised masticatory function.<sup>8</sup> Caries can lead to tooth decay, cavities, and fractures, hindering optimal dental development. Furthermore, dental pain can reduce school attendance, impair concentration, and affect appetite and nutritional intake, ultimately impeding physical growth.<sup>7</sup> Parents play a crucial role in instilling oral hygiene habits to prevent dental caries in children. Mothers, in particular, serve as primary role models in daily life and are essential in maintaining their children's oral health.<sup>9</sup> Brushing teeth is a fundamental habit that should be established early to maintain oral hygiene.<sup>10</sup> Brushing at least twice daily, in the morning after breakfast and at night before sleep, is an effective method for preventing tooth decay.<sup>9</sup>

Research by Susilawati et al.<sup>3</sup> demonstrates a significant correlation between dental caries status and children's quality of life. High caries experience indices are associated with poorer quality of life. Similarly, Thioritz and Asridiana<sup>4</sup> found that 47 respondents had severe caries, indicating a link between caries and quality of life. Another study by Putri et al.<sup>6</sup> concluded that there is a significant relationship between the severity of early childhood caries and children's quality of life in terms of eating disorders, but not in terms of speech, learning, or sleep disturbances.

In general, quality of life has been used to describe the impact of oral health conditions and their treatment, particularly in children. The Oral Health-Related Quality of Life (OHRQoL) theory, established by Locker in 1988, is used to measure an individual's quality of life based on their perceived oral health.<sup>6</sup> Therefore, maintaining quality of life in early childhood is crucial in mitigating oral health issues. This study analyses the relationship between the severity of dental caries and the quality of life of children at Bersama Ceria Kindergarten, Delitua.

## Method

This research employed an analytical survey design with a cross-sectional approach, conducted at Bersama Ceria Kindergarten in Delitua from October to November 2024. The study population comprised all children attending the kindergarten, with a sample of 30 children selected using purposive sampling. Inclusion criteria encompassed children aged 4-5 years who could communicate effectively, while exclusion criteria included children whose parents did not consent to their participation or those who were absent during the study period. The instruments used in this research included a diagnostic set for caries examination and the Early Childhood Oral Health Impact Scale (ECOHIS) questionnaire to assess children's quality of life, completed by the children's mothers. The research procedure commenced with ethical approval and research permit acquisition, followed by sample selection, caries examination of the children using the diagnostic set, and completion of the ECOHIS questionnaire by the mothers. The examination and questionnaire results were then recorded and analyzed using the Statistical Package for the Social Sciences (SPSS). Data analysis was conducted using univariate methods to determine the mean scores for caries and quality of life, and bivariate methods with Spearman's correlation test to identify the relationship between caries severity and children's quality of life.

## Results

The research findings indicate that the majority of respondents were male, comprising 18 individuals (60%), while females accounted for 12 individuals (40%). The predominant age group among respondents was 4 years old, with 22 participants (73.3%), whereas 5-year-olds represented only 8 participants (26.7%). The study revealed the following mean values for dental caries: decayed teeth (d)  $5.47 \pm 2.474$ , extracted teeth (e)  $0.80 \pm 1.064$ , and filled teeth (f)  $0.13 \pm 0.434$ . The overall mean def-t score was  $6.40 \pm 2.908$  (Table 1). The research demonstrated that the mean quality of life score, as measured by the ECOHIS, was  $46.43 \pm 7.873$  (Table 2).

Table 1. Caries severity

Caries severity	d	e	f	def-t
$\bar{x} \pm SD$	$5,47 \pm 2,474$	$0,80 \pm 1,064$	$0,13 \pm 0,434$	$6,40 \pm 2,908$

Table 2. Children's quality of life based on ECOHIS

Quality of life	$\bar{x} \pm SD$
	$46,43 \pm 7,873$

The data were found to be normally distributed ( $p > 0.05$ ) but not homogeneous ( $p < 0.05$ ). Spearman's rank correlation coefficient was employed for data analysis.

Table 3. Normality and homogeneity test results

Variable	Shapiro-Wilk Normality Test	Levene's Test of Homogeneity
	<i>p</i> value	<i>p</i> value
def-t	0,304	0,000
Quality of life	0,682	

Spearman's rank correlation analysis revealed a significant relationship between caries severity and children's quality of life at TK Bersama Ceria Delitua. This relationship was strong and positive ( $p = 0.003$ ;  $r = 0.521$ ), indicating that higher def-t scores were associated with poorer quality of life. Caries severity accounted for 52.1% of the variance in quality of life, while the remaining 47.9% was attributable to other variables not examined in this study.

Table 4: Relationship between caries severity and children's quality of life

Caries severity	Quality of life	<i>p</i> value	<i>r</i>
$\bar{x} \pm SD$	$\bar{x} \pm SD$		
6,40±2,908	46,43±7,873	0,003*	0,521

## Discussion

This study was conducted on 30 students at Bersama Ceria Kindergarten in Delitua. The results indicated a higher proportion of male students (60%) compared to female students (40%). This contrasts with the findings of Putri and Adnani<sup>11</sup>, who reported a female student majority of 21 (52.5%) at Pertiwi 27 Kretek Kindergarten and PKK III Plakaran Kindergarten. This discrepancy may be attributed to female students' greater attention to oral hygiene compared to male students, possibly due to concerns about dental caries.<sup>12</sup>

Regarding age distribution, the majority of respondents were 4 years old (73.3%), while 5-year-olds accounted for only 26.7%. This finding diverges from Putri and Adnani's<sup>11</sup> study, which found that 5-year-olds constituted the largest age group (87.5%) at Pertiwi 27 Kretek Kindergarten and PKK III Plakaran Kindergarten. Jingga et al.<sup>13</sup> suggested that age significantly influences dental caries incidence, with an 83% correlation. Early childhood caries render preschool children more susceptible to caries infections in both deciduous and permanent teeth.

Dental caries is a prevalent oral health issue among young children.<sup>7</sup> The present study revealed a mean def-t score of  $6.40 \pm 2.908$  among Bersama Ceria Kindergarten students, indicating a high caries prevalence. This is consistent with Susilawati et al.'s (2023) research, which reported that 62% of 50 students had def-t scores above 2, with an average score of 4.9.<sup>3</sup> However, Jingga et al.<sup>13</sup> observed a contrasting result in Islamic Pangeran Diponegoro Kindergarten, where 84.8% of respondents had caries, with 53.6% exhibiting very high def-t scores. Similarly, Putri et al.<sup>6</sup> reported a very high def-t index.

The occurrence of dental caries can be attributed to children's dietary preferences for sugary foods. Sugary foods are rich in carbohydrates, sticky, and easily broken down in the oral cavity. Plaque forms from food residues adhering to interdental spaces, fostering bacterial growth that converts glucose to acid, thereby eroding tooth enamel. Frequent carbohydrate consumption leads to increased bacterial acid production, acidifying the oral environment and exacerbating enamel erosion.<sup>14</sup> This is supported by Putri and Adnani's<sup>11</sup> finding that 85% of children who consumed cariogenic foods experienced caries. Early tooth brushing habits can mitigate caries risk, emphasizing the importance of parental involvement.<sup>10</sup> Preschool children with unsupervised tooth brushing practices have a 3.00-fold higher risk of developing dental caries compared to those with parental supervision.<sup>11</sup>

Preschool children often encounter severe caries issues, leading to tooth decay, cavities, fractures, and impaired masticatory function. Untreated caries can disrupt oral function and activities, adversely affecting children's quality of life across various domains, including oral symptoms, emotional distress, functional limitations, and social constraints.<sup>3,11</sup> The present study found a mean ECOHIS score of  $46.43 \pm 7.873$  among Bersama Ceria Kindergarten students. In contrast, another study reported that only 15 children had good quality of life, while 7 had poor quality of life.<sup>3</sup>

Spearman's correlation analysis revealed a significant positive correlation between caries severity and children's quality of life at Bersama Ceria Kindergarten ( $p=0.003$ ;  $r=0.521$ ). Thus, increased caries severity is associated with diminished quality of life. This aligns with Susilawati et al.'s<sup>3</sup> finding of a significant

correlation between def-t and quality of life in children with deciduous teeth ( $p < 0.05$ ). This finding is also supported by Putri et al.<sup>11</sup> who reported a significant association between early childhood caries severity and children's quality of life in several kindergartens in Banjarmasin.

Reduced quality of life in children indicates serious oral health problems. Children with inadequate oral hygiene exhibit poorer quality of life than those with better oral hygiene.<sup>15</sup> Low public awareness regarding early prevention can contribute to childhood caries. Simple preventive measures, such as dietary modifications to reduce sugar intake and regular oral hygiene practices, can help minimize caries risk in children.<sup>3</sup>

## Conclusion

Research findings indicate a mean def-t index of  $6.40 \pm 2.908$ . The def-t components were distributed as follows: a mean decay (d) of  $5.47 \pm 2.474$ , a mean extraction (e) of  $0.80 \pm 1.064$ , and a mean filling (f) of  $0.13 \pm 0.434$ . The mean quality of life in children, as measured by the ECOHIS instrument, was  $46.43 \pm 7.873$ . A significant correlation was observed between the severity of dental caries (def-t) and the quality of life in children at TK Bersama Ceria Delitua. This relationship demonstrated a strong positive correlation, with a p-value of 0.003 and a correlation coefficient (r) of 0.521. In general, the research results suggest that an increase in the def-t value corresponds to a decrease in the quality of life in children.

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