

# The Relationships Among Oral Health Practices, Early Childhood Caries, and Oral Health-related Quality of Life in Indonesian Preschool Children: A Cross-Sectional Study

Atik Ramadhani<sup>1</sup>, Safira Khairinisa<sup>2</sup>, Febriana Setiawati<sup>1</sup>, Risqa R. Darwita<sup>1</sup>, Diah A. Maharani<sup>1</sup>

<sup>1</sup>Department of Preventive and Public Health Dentistry, Faculty of Dentistry, Universitas Indonesia, Indonesia,

<sup>2</sup>Undergraduate Student Program, Faculty of Dentistry, Universitas Indonesia, Indonesia

ABSTRACT

**Objectives:** This study aimed at evaluating the relationships among oral health practices, early childhood caries (ECC), and oral health-related quality of life (OHRQoL) in five-year-old children in Indonesia. **Materials and Methods:** Overall, 266 parent–child pairs (PCPs) from preschools in Jakarta participated in a cross-sectional study. The ECC was clinically assessed by two calibrated screeners using the decayed, missing, and filled teeth (dmft) and the pufa index, which records the presence of severely decayed teeth with visible pulpal involvement (p), ulceration caused by dislocated tooth fragments (u), fistula (f), and abscess (a). The parents of the participating children completed the self-administered questionnaire comprising SOHO-5p and their oral health practices. The SOHO-5c questionnaire was used to interview the children. **Results:** The prevalence of ECC was 88.7%, with 35% having pufa index scores greater than 0. There were significant relationships among oral health practices, ECC, and the Scale of Oral Health Outcomes for 5-year-old children (SOHO-5) scores. There was also a significant relationship between cariogenic food consumption and the dmft and SOHO-5p scores. There was a significant relationship between ECC and the SOHO-5 scores. All the SOHO-5p variables except smile avoidance because of appearance had a significant relationship with the dmft and pufa variables. Eating and sleeping difficulties were significantly related to the dmft and pufa scores. **Conclusion:** OHRQoL was found to be related to the dmft and pufa scores, and the parents' perceptions were more strongly correlated than the children's. No significant difference was found in the perceptions indicated by the SOHO-5p and SOHO-5c scores. This suggests that parents can be used as proxies regarding their children's OHRQoL.

**KEYWORDS:** Early childhood caries, Indonesia, oral health practices, preschool children, quality of life

Received : 09-10-20

Revised : 08-01-21

Accepted : 03-03-21

Published : 15-04-21

## INTRODUCTION

ECC is an ongoing global oral health issue that affects infants and preschool children, especially those in low and middle socioeconomic groups.<sup>[1]</sup> ECC is defined as the presence of one or more decayed (noncavitated or cavitated lesion), missing, or filled tooth surfaces resulting from caries in any primary

tooth in a child younger than 71 months.<sup>[2]</sup> The prevalence of dmft in 5-year-old children in Indonesia was 82.5%, with a mean index of 7.20 (SD = 5.94).<sup>[3]</sup>

**Address for correspondence:** Dr. Diah A. Maharani, Department of Preventive and Public Health Dentistry, Faculty of Dentistry, Universitas Indonesia, Indonesia.  
E-mail: diah.ayu64@ui.ac.id

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

**For reprints contact:** reprints@medknow.com

**How to cite this article:** Ramadhani A, Khairinisa S, Setiawati F, Darwita RR, Maharani DA. The relationships among oral health practices, early childhood caries, and oral health-related quality of life in Indonesian preschool children: A cross-sectional study. *J Int Soc Prevent Communit Dent* 2021;11:158-65.

Access this article online

Quick Response Code:



Website: [www.jispcd.org](http://www.jispcd.org)

DOI: 10.4103/jispcd.JISPCD\_388\_20

Childhood dental caries has a complex etiology. Some risk factors, including biological, health behavioral, and socioeconomic issues, lack of parental education, and access to dental care, are known to contribute to caries.<sup>[4]</sup> Parents play a pivotal role in mitigating the risks of dental caries and promoting positive oral health behaviors in young children.<sup>[5]</sup> Parents' oral health behaviors, including oral hygiene practices and cariogenic food consumption, are directly related to the oral health of their children.<sup>[6]</sup> This relationship needs to be considered, because ECC can negatively affect the permanent teeth, thereby leading to future dental problems.

Beyond the associated pain and suffering, untreated caries can negatively affect the OHRQoL of children and their parents.<sup>[7]</sup> ECC could affect physical development because of poor nutrition, and lost school days can lead to poor academic performance or the reduced ability to learn.<sup>[8,9]</sup> Moreover, ECC has indirect effects on parents or caregivers, including family stress, feeling guilty, lost workdays, disrupted sleep, and financial harm because of the time and money spent caring for their children.<sup>[10]</sup>

Several OHRQoL assessments have been used; however, most of the instruments for children younger than eight years old were completed by parents. Despite being commonly used as proxies, parents do not always perceive the OHRQoL of their children accurately.<sup>[11]</sup> Ideally, both sets of perceptions are needed. Parents' proxy reports should be viewed as complementary rather than alternative sources of information on children's oral health.<sup>[4]</sup> Studies have indicated that the SOHO-5 is a reliable and valid self-report instrument for young children.<sup>[11]</sup> A few studies have investigated the effects of caries on the quality of life of young Indonesian children.<sup>[12]</sup> This study aimed at analyzing oral health practices in relation to ECC and OHRQoL in five-year-old children, at evaluating the relationship between ECC and OHRQoL, and at determining the differences in parent and child perceptions through the SOHO-5.

## MATERIALS AND METHODS

A cross-sectional study was conducted with five-year-old children and their parents. The data were collected between August and October 2019. The study followed the guidelines in the STrengthening the Reporting of OBServational Studies in Epidemiology (STROBE) statement.<sup>[13]</sup> The study was conducted in East Jakarta, which has a high prevalence of ECC and the lowest access to oral health care in school-aged children.<sup>[14]</sup> Sample size estimation suggested that a total of 216 PCPs completing the study would be sufficient for

detecting statistical significance ( $p < 0.05$ ) with a power of 95%, assuming an effect size of 0.35. The participants were recruited from 10 districts in East Jakarta and the local community health center, and they were willing to participate and provide authorization. All PCPs that met the inclusion criteria were invited to participate. The inclusion criteria were: five-year-old children with parents who were willing to participate and the absence of medical conditions that could compromise the study outcomes. The parents were asked to provide consent before the survey was conducted, and only children with signed consent forms were recruited.

The parents were asked to complete a self-administered questionnaire regarding the child's and the family's demographic information, the child's oral health practices, and SOHO-5 parental version. The children participated in face-to-face interviews independently of their parents to avoid parental influence when they filled out the SOHO-5 children version.<sup>[15]</sup> The child's and the family's demographic information comprised gender, date of birth, number of siblings, and parental education level categorized as low (less than junior and junior high school), moderate (senior high school), and high (higher than a bachelor's degree and bachelor's degree). The child's oral health practices were measured by the reported oral hygiene practices and cariogenic food consumption. The questionnaire was adapted from a previous study that used a 5-point Likert scale (0 = never, 1 = seldom, 2 = sometimes, 3 = often, and 4 = always).<sup>[16]</sup> The validity and internal consistency reliability were assessed by administering the questionnaire to 20 parents who did not participate in the study. The protective factors in oral hygiene practices are toothbrushing (everyday, before going to bed, and after eating sweet foods), supervised toothbrushing, and six-monthly dental visits. The risk factors in cariogenic food consumption are snacking (candies, sweet snacks foods, and sugary drinks) at least once per day and sucking food. The score for each factor ranged from 0 to 20. A higher score indicated worse oral health practices in parents' perception.

The SOHO-5 child version addresses eating, drinking, speaking, playing, and sleeping difficulties and smile avoidance because of pain and appearance. The responses were made on a 3-point scale (no = 0, a little = 1, and a lot = 2) with the aid of face cards. The SOHO-5 parent's version included questions about eating, drinking, speaking, playing, sleeping difficulties, and smile avoidance because of pain and appearance, as well as the effects on self-confidence. The answers were provided on a 5-point Likert scale (no = 0, a little = 1, moderate = 2, a lot = 3, and a great deal = 4).

The SOHO-5 scores were calculated as the sum of the answers, and the total scores ranged from 0 to 14 for the children and from 0 to 26 for the parents. A higher score reflected a greater effect on the child's OHRQoL.<sup>[12]</sup>

The clinical examination was performed by two trained, calibrated dentists using sterilized dental mirrors, pocket probes, and intraoral light-emitting diode devices. Examiner agreement was assessed by duplicate examinations in 10% of the children, and the kappa value was calculated. The diagnostic criteria for dental caries followed the WHO's recommendations, and the caries experience was measured by using dmft index.<sup>[17]</sup> The pufa index was used to evaluate caries severity.<sup>[18]</sup> These index diagnostic criteria are visible p, u, f, and a. The dmft and pufa scores for each index range from 0 to 20 teeth.

All data were entered into spreadsheets and analyzed in IBM SPSS Statistics for Windows, Version 22.0 (IBM Corp., Armonk, NY, USA). Spearman's rank correlation coefficients were calculated to determine the strength of the following correlations: oral health practices with dmft, pufa, and SOHO-5 scores; and dmft, pufa with SOHO-5 scores. Mann-Whitney *U* and Kruskal-Wallis *H* tests were used to analyze the differences in the SOHO-5 scores for ECC severity and the pufa score. For all tests, statistical significance was set at 5% ( $P < 0.05$ ) with a 95% confidence interval (CI).

The relationship between the PCPs was assessed with the comparison of the mean directional differences. The children's scores were subtracted from the parents' scores as an indicator of bias and then compared with the null hypothesis. The one-sample Wilcoxon signed-rank test was used to determine statistical significance. The mean absolute difference was calculated by ignoring the positive and negative signs of the directional differences between the PCPs as an indicator of agreement.

## RESULTS

Overall, 287 children and their parents were invited to participate in the study; of these, 21 PCPs were excluded because of incomplete consent form ( $n=4$ ), absence of the child on the day ( $n=13$ ), and the child's refusal during the clinical examination ( $n=4$ ). A total of 266 PCPs were included in the present study (a 92.7% response rate). The values for Cronbach's alpha, which was used to determine the internal consistency reliability of the oral hygiene practices and cariogenic food consumption questionnaire, were 0.873 and 0.824, respectively, thus indicating good internal reliability. Intraexaminer reproducibility (kappa value) of dmft and pufa scores was 0.97 and 0.89, respectively.

Further, interobserver reliability indicated almost perfect agreement.

Table 1 describes the subjects' characteristics. The children in this study were evenly distributed by gender (50.4% male and 49.6% female). Almost all children (88.7%) had decayed teeth, 64 (24.1%) had missing teeth because of caries, and only 8 (3%) had filled teeth. The pufa prevalence was 35%. The major component was pulpal involvement (29.7%), and the second most frequent finding was fistula formation (9%).

The parents' or children's mean scores for the dmft, pufa, oral health practices, and SOHO-5 perceptions are summarized in Table 2. The children's mean dmft and pufa scores were  $7.7 \pm 5.5$  and  $0.9 \pm 1.7$ , respectively. Among SOHO-5 analyzed items, the highest-impact item to OHRQoL was eating difficulties.

**Table 1: Sociodemographic and clinical characteristics of the sample**

Subject characteristics	N (%)
Parents' demographics	
Mother's education level	
High	102 (38.2)
Moderate	133 (49.8)
Low	31 (11.6)
Father's education level	
High	109 (40.8)
Moderate	136 (50.9)
Low	21 (7.9)
Children's demographics	
Gender	
Male	134 (50.4)
Female	132 (49.6)
Number of siblings	
None	47 (17.6)
One or two siblings	198 (74.2)
More than two siblings	20 (7.5)
Children's oral health status	
dmft index (>0)	
dmft	236 (88.7)
dt	236 (88.7)
mt	64 (24.1)
ft	8 (3)
Untreated caries severity	
Caries absence (dmft = 0)	30 (11.3)
ECC (dmft = 1–5)	76 (28.6)
S-ECC (dmft ≥ 6)	160 (60.1)
pufa index (>0)	
pufa	93 (35)
p	79 (29.7)
u	5 (1.9)
f	24 (9)
a	6 (2.3)

**Table 2: Parents' and children's mean dmft, pufa, oral health practices, and SOHO-5 scores**

Items	Mean (SD)
Child's oral health status	
Total dmft score	<b>7.7 (5.5)</b>
d	7.1 (4.9)
m	0.6 (1.2)
f	0.1 (0.5)
Total pufa score	<b>0.9 (1.7)</b>
p	0.7 (1.5)
u	0.0 (0.2)
f	0.1 (0.4)
a	0.0 (0.2)
Oral hygiene practices	
Total score	<b>8.3 (3.1)</b>
Daily toothbrushing	0.5 (0.7)
Toothbrushing before going to sleep	1.7 (1.1)
Toothbrushing after consuming sweet snack foods	2.0 (1)
Supervised toothbrushing	0.8 (1)
Regular dental appointments	3.2 (1.1)
Cariogenic food consumption	
Total score	<b>9.1 (2.9)</b>
Snacking	2.1 (1.1)
Candy at least once per day	1.7 (1)
Sweet snack foods at least once per day	2.5 (0.8)
Sugary drink at least once per day	2.1 (1)
Sucking food	0.7 (1.1)
SOHO-5	
SOHO-5c total score (0–14)	<b>1.6 (2.1)</b>
Eating difficulties (0–2)	0.6 (0.7)
Speaking difficulties (0–2)	0.2 (0.5)
Speaking difficulties (0–2)	0.1 (0.4)
Playing difficulties (0–2)	0.2 (0.4)
Sleeping difficulties (0–2)	0.4 (0.6)
Smile avoidance (because of pain) (0–2)	0.1 (0.4)
Smile avoidance (because of appearance) (0–2)	0.1 (0.3)
SOHO-5p total score (0–26)	<b>2.1 (3.2)</b>
Eating difficulties (0–4)	0.8 (1)
Speaking difficulties (0–4)	0.3 (0.6)
Speaking difficulties (0–4)	0.2 (0.6)
Playing difficulties (0–4)	0.2 (0.5)
Sleeping difficulties (0–4)	0.3 (0.6)
Smile avoidance (because of pain) (0–4)	0.3 (0.7)
Smile avoidance (because of appearance) (0–4)	0.2 (0.6)

Bold entries show the total score of each item.

The lowest were smile avoidance because of appearance (SOHO-5c) and playing difficulties (SOHO-5p).

The correlations between the oral health practices and the dmft, pufa, and SOHO-5 scores are presented in Table 3. Oral health practice was found to be significantly associated with the dmft. The relationship between the parents' perceptions of the children's oral health practices and OHRQoL was also evaluated. A correlation was found between SOHO-5p with total

oral hygiene practices and cariogenic food consumption scores. Of the analyzed items, only daily toothbrushing was significantly correlated with the children's and parents' SOHO-5 scores.

There was a tendency of increasing OHRQoL impact along with ECC severity and pufa score. The ECC severity and pufa scores were statistically significant with SOHO-5 on parental and child version scores. Moreover, correlation coefficient indicated stronger positive correlations between the SOHO-5 in parents' perceptions and dmft than the children's perceptions [Table 4]. Almost all analyzed items of the SOHO-5p were significantly correlated with the dmft and pufa indexes. The exception was smile avoidance because of appearance, which was correlated with the dmft index only. In the children's version, only eating and sleeping difficulties were significantly correlated with the dmft and pufa scores [Table 5].

Table 6 describes the correlation between dmft, pufa, and SOHO-5 scores. Difficulty sleeping and avoiding smiling due to pain as well as appearance were reported as having different tendencies in parents and their children. Table 7 showed the mean directional and absolute differences for total and SOHO-5 item scores in PCP. Regarding the total scores, there was no significant difference between the SOHO-5p and SOHO-5c scores except for sleeping difficulties and smiling avoidance because of pain and appearance. The SOHO-5 absolute difference ranged from 0 to 11, with an average of 1.7, thereby indicating 12% of the maximum possible score of 14. The absolute difference for each item varied from 0.2 to 0.6, with eating being the highest difficulty. This number represents 10% to 30% of the maximum value of each variable.

## DISCUSSION

Dental caries have several negative effects, especially on young children's lives, through diminished masticatory performance and general appearance, and this is reflected in their growth and development. The effects of ECC on quality of life have been widely documented; however, only limited studies have been conducted in Indonesia<sup>[7,9,12]</sup> This cross-sectional study aimed at assessing the caries experience regarding oral health practices and the effects on OHRQoL in Indonesian preschool children. Specifically, the study evaluated the effects of improper oral hygiene practices and dental caries and their severity on the OHRQoL of young children based on the children's and parents' perceptions. Because the parents' proxy reports are not always identical to their children's responses, this assessment becomes relevant.



**Table 3: Correlations between oral health practices with dmft, pufa, and SOHO-5 scores**

	dmft		pufa		SOHO-5c		SOHO-5p	
	r	p	r	p	r	p	r	p
Oral hygiene practices total score	<b>0.19</b>	<b>0.002*</b>	<b>0.07</b>	<b>0.254</b>	<b>0.054</b>	<b>0.378</b>	<b>0.270</b>	<b>0.000*</b>
Daily toothbrushing	0.166	0.07	0.037	0.543	0.14	0.022*	0.277	0.000*
Toothbrushing before going to sleep	0.075	0.225	0.084	0.171	-0.007	0.907	0.216	0.001*
Toothbrushing after consuming sweet foods	0.169	0.006*	0.117	0.057	0.088	0.151	0.205	0.001*
Supervised toothbrushing	0.221	0.000*	0.037	0.546	0.048	0.438	0.214	0.000*
Regular dental appointments	-0.009	0.882	-0.076	0.216	-0.075	0.224	-0.05	0.420
Cariogenic food consumption total score	<b>0.14</b>	<b>0.022*</b>	<b>0.023</b>	<b>0.708</b>	<b>-0.001</b>	<b>0.989</b>	<b>0.136</b>	<b>0.026*</b>
Snacking	0.021	0.73	-0.042	0.496	0.001	0.879	0.077	0.213
Candy at least once per day	0.113	0.065	0.002	0.971	0.037	0.547	0.068	0.270
Sweet food at least once per day	0.116	0.058	0.045	0.465	-0.016	0.800	0.058	0.345
Sugary drink at least once per day	0.084	0.175	-0.034	0.586	-0.028	0.651	0.025	0.688
Sucking food	0.098	0.113	0.027	0.660	0.032	0.604	0.205	0.001*

<sup>a</sup> Spearman's rank correlation coefficient; \**p* < .05 significance.

**Table 4: Relationships between early childhood caries severity, pufa, and SOHO-5 scores**

	SOHO-5c		SOHO-5p	
	Mean (SD)	p-value	Mean (SD)	p-value
ECC severity <sup>a</sup>		0.007*		0.000*
Caries free (dmft = 0)	0.79 (1.59)		0.55 (1.09)	
ECC (dmft = 1-5)	1.22 (1.84)		1.28 (2.46)	
S-ECC (dmft ≥ 6)	1.94 (2.19)		3.0 (3.54)	
pufa score <sup>b</sup>		0.000*		0.000*
pufa = 0	1.20 (1.81)		1.43 (2.44)	
pufa > 0	2.25 (2.3)		3.46 (3.85)	

<sup>a</sup>Kruskal-Wallis; <sup>b</sup>Mann-Whitney; \*significant correlation at *p* < .05.

**Table 5: Correlation of dmft and pufa scores with oral health-related quality of life**

	SOHO-5c				SOHO-5p			
	dmft		pufa		dmft		pufa	
	r	p	r	p	r	p	r	p
Total score	<b>0.252</b>	<b>0.000*</b>	<b>0.25</b>	<b>0.000*</b>	<b>0.442</b>	<b>0.000*</b>	<b>0.36</b>	<b>0.000*</b>
Eating difficulties	0.268	0.000*	0.234	0.000*	0.377	0.000*	0.35	0.000*
Drinking difficulties	0.072	0.243	0.137	0.026	0.229	0.000*	0.20	0.001*
Speaking difficulties	0.027	0.665	0.055	0.371	0.187	0.002*	0.26	0.000*
Playing difficulties	0.000	0.999	0.037	0.546	0.139	0.024*	0.13	0.038*
Sleeping difficulties	0.341	0.000*	0.239	0.000*	0.349	0.000*	0.27	0.000*
Smile avoidance (because of pain)	0.058	0.348	0.046	0.458	0.252	0.000*	0.26	0.000*
Smile avoidance (because of appearance)	0.014	0.820	0.055	0.375	0.228	0.000*	0.11	0.082

<sup>a</sup>Spearman's rank correlation coefficient; \*significance at *p* < .05.

**Table 6: Distribution of directional differences for total and SOHO-5 item scores in parent-child pairs**

	<i>p</i> > c (%)	<i>p</i> = c (%)	<i>p</i> < c (%)
Total score	<b>31.2</b>	<b>37.2</b>	<b>31.6</b>
Eating difficulties	25.5	48.7	25.2
Drinking difficulties	13.2	72.9	13.9
Speaking difficulties	9.4	78.9	11.7
Playing difficulties	12.4	76.3	11.3
Sleeping difficulties	21.8	65.8	12.4
Smile avoidance (because of pain)	12.8	85	2.3
Smile avoidance (because of appearance)	7.5	80.1	12.4

**Table 7: Mean directional and absolute differences for total and SOHO-5 item scores in parent-child pairs**

	Directional Difference <sup>a</sup>			d <sup>c</sup>	Absolute Difference
	Mean (SD)	95% CI	p <sup>b</sup>		Mean (SD) <sup>d</sup>
Total score	<b>&lt;0.01 (2.60)</b>	<b>-0.32; 0.32</b>	<b>0.98</b>	<b>0.0</b>	<b>1.7 (2.0)</b>
Eating difficulties	0.02 (0.86)	-0.09; 0.12	0.74	0.0	0.6 (0.6)
Drinking difficulties	0.01 (0.58)	-0.06; 0.08	0.73	0.0	0.3 (0.5)
Speaking difficulties	-0.01 (0.52)	-0.08; 0.05	0.75	0.0	0.2 (0.5)
Playing difficulties	0.04 (0.55)	-0.03; 0.11	0.21	0.0	0.3 (0.5)
Sleeping difficulties	0.13 (0.67)	0.05; 0.21	0.001*	0.2	0.4 (0.6)
Smile avoidance (because of pain)	-0.11 (0.59)	-0.18; -0.04	0.002*	0.2	0.3 (0.5)
Smile avoidance (because of appearance)	-0.06 (0.51)	0.13; <0.01	0.042*	0.1	0.2 (0.5)

<sup>a</sup>Difference between parents' scores, accounting for the direction of the differences (indicator of bias).

<sup>b</sup>p-values obtained from one-sample Wilcoxon signed-rank test.

<sup>c</sup>Standardized difference = mean directional difference/standard deviation of directional difference.

<sup>d</sup>Difference between parents' scores irrespective of the direction of the differences (indicator of agreement).

Socioeconomic status, parental education, family composition, health status, and family behaviors are known risk factors for the development of ECC.<sup>[1]</sup> In the present study, almost half of the parents had a senior high school education. Several studies have found that parents' education levels, especially maternal knowledge, play an important role in children's oral health.<sup>[19,20]</sup> Parents with high education levels and sufficient incomes tend to pay more attention to their children's dental care, as well as keeping their teeth healthy.<sup>[19]</sup>

The results in this study demonstrate that almost all the children who had caries experiences suffered from S-ECC. The reason could be poor oral hygiene and limited parental knowledge of the children's oral health.<sup>[21]</sup> Parents must consider the ECC-related protective and risk factors. Regular dental visits and twice-daily toothbrushing with fluoridated toothpaste are important for enhancing preventive dental care in children.<sup>[4]</sup> Two poor dietary practices that are potential risk factors for dental caries are the age at which sugar is introduced and the frequency of consumption.<sup>[22]</sup> It is necessary that parents promote healthy dietary practices and good oral hygiene in young children.

In the population under study, there was a clear correlation between several domains in oral hygiene practices and the dmft index. Good oral hygiene is a key to oral health.<sup>[23]</sup> The lack of regular toothbrushing, fluoride exposure, and parental toothbrushing supervision contribute to the development of S-ECC in children.<sup>[24]</sup> In addition to oral hygiene behavior, daily sugar consumption has been found to be significantly associated with caries severity as measured by the dmft index and perhaps subsequently the risk of pufa.<sup>[22,23]</sup> In the present study, significant correlation was found between cariogenic food consumption and dmft but not with pufa index. This discrepancy suggests that

oral hygiene practices rather than a high frequency of cariogenic food consumption lead to caries development in preschool children. Moreover, S-ECC is a disease that results from the interactions of several factors, including the consumption of fermentable carbohydrates, presence of cariogenic microorganisms, and social determinants of health.<sup>[4]</sup>

The present study found that children's caries and oral health practices were more significantly correlated with the SOHO-5p than the SOHO-5c. The association between dental caries, which results from poor oral hygiene and frequent cariogenic food consumption, and parents' perceptions of OHRQoL has been examined. Parents' perceptions have been found to be limited to the clinical condition, such as dental caries with a toothache. However, the children's perceptions are often broader and include social factors, such as family, friends, environment, and emotional and cognitive development.<sup>[25]</sup>

A significant correlation was found between the children's and parents' SOHO-5 scores and the presence of dental disease in the study population. The children's and families' OHRQoL was negatively affected by the caries experience. The greater the caries severity, the more negative were the effects on OHRQoL.<sup>[26]</sup> The children's and parents' perceptions of eating and sleeping difficulties were significantly associated with the caries experience and negatively affected the children's OHRQoL. The results were similar to those of a previous study in which the frequency of positive responses for effects, such as toothaches, fever, missed school, and eating, drinking, and sleeping difficulties, were significantly higher in children with ECC and S-ECC.<sup>[27,28]</sup> Toothaches affect not only oral function but also children's routines, such as sleeping, eating, drinking, and even the parents' quality of life through lost working days, dental expenses, restlessness, and altered sleep patterns.<sup>[9]</sup>

Parents often provide proxy reports on young children's OHRQoL; however, their perceptions might not be identical to their children's.<sup>[11,27]</sup> The results of the present study indicate that the parents' perceptions of sleeping difficulties and smile avoidance because of pain and appearance were significantly different from those of their children. This is consistent with the results of previous studies in which parents were found to have limited knowledge of their children, especially their emotions and feelings about pain and appearance.<sup>[29]</sup> Parents' perceptions might be reliable only for physical activities, function, and symptoms but not social and emotional status.<sup>[30]</sup> Moreover, parents are not always with their children because of work, the children's schooling, or their ability to pay for childcare. Thus, some parents might not have complete information about their children's daily lives. This could explain the differences between the parents' and children's perspectives on the children's OHRQoL.<sup>[12,27]</sup> Five-year-old children were found to have the ability to reliably report on their own OHRQoL.<sup>[11]</sup> However, it has been acknowledged that there could be issues related to recall and limited capability of children for abstract thinking. Therefore, parents' reports should still be used.

Parents' and children's perceptions are needed to allow for the best treatment decisions to maintain children's oral health.<sup>[29]</sup> Mothers rather than fathers have been found to be reliable proxies because they spend more time with their children, including caring for their children's health.<sup>[11]</sup> Further studies on interviews with parents, especially mothers, are needed to address the discrepancies in parents' proxy reports to improve analysis. Family and social background should also be adjusted to obtain more reliable results. Results of this study should be interpreted with caution. The limitations of this study are that the results might not be generalizable to all children in Indonesia and might also not be representative of five-year-old children who did not attend school. Future studies should be performed in bigger samples, and cohort studies should be conducted to evaluate the sensitivity of the SOHO-5.

## CONCLUSION

There was a significant relationship between oral health practices, ECC, and OHRQoL. Parents' perceptions were significantly related to their children's oral health practices. OHRQoL was found to be related to the dmft and pufa scores. No significant difference was found between the perceptions indicated by the SOHO-5p and SOHO-5c. This suggests that parents can be used as proxies to determine their child's OHRQoL. OHRQoL assessments using the SOHO-5 may facilitate

ECC management beyond the clinical parameters. A promotive and preventive program for parents is required to address oral health in early childhood in Indonesia.

## ACKNOWLEDGMENT

The authors would like to thank Universitas Indonesia to support this research through PUTI Q2 Grant (No. BA-1328/UN2.RST/PPM.00.03.01/2020).

## FINANCIAL SUPPORT AND SPONSORSHIP

This research was funded by Universitas Indonesia. Financial support included for the data collection and presentation of results.

## CONFLICTS OF INTEREST

The authors declare that they have no competing interests.

## AUTHORS' CONTRIBUTIONS

All author had contributed to study conception, data collection, data acquisition and analysis, data interpretation, manuscript writing. All authors have read and approved the manuscript.

## ETHICAL POLICY AND INSTITUTIONAL REVIEW BOARD STATEMENT

Ethical approval was granted by the Research Ethics Committee of the Faculty of Dentistry, Universitas Indonesia. This research was conducted in full accordance with the World Medical Association Declaration of Helsinki. The principal investigator is responsible for ensuring the confidentiality of the study documents and protecting the anonymity of all respondents.

## PATIENT DECLARATION OF CONSENT

Written informed consent was provided by the parents and participating respondents assented to participation.

## DATA AVAILABILITY STATEMENT

The raw data are available from the authors to any author who wishes to collaborate.

## REFERENCES

1. Phantumvanit P, Makino Y, Ogawa H, Rugg-Gunn A, Moynihan P, Petersen PE, *et al.* WHO global consultation on public health intervention against early childhood caries. *Community Dent Oral Epidemiol* 2018;46:280-7.
2. American Academy on Pediatric Dentistry. Policy on Early Childhood Caries (ECC): Classifications, consequences, and preventive strategies. *Pediatr Dent* 2017;39:59-61.
3. Maharani DA, Pratiwi AN, Setiawati F, Zhang S, Gao SS, Chu CH, *et al.* Tooth wear among five-year-old children in Jakarta, Indonesia. *BMC Oral Health* 2019;19:192.
4. Tinanoff N, Baez RJ, Diaz Guillory C, Donly KJ, Feldens CA, McGrath C, *et al.* Early childhood caries epidemiology, aetiology, risk assessment, societal burden, management, education, and policy: Global perspective. *Int J Paediatr Dent* 2019;29: 238-48.

5. Matsuyama Y, Isumi A, Doi S, Fujiwara T. Poor parenting behaviours and dental caries experience in 6- to 7-year-old children. *Community Dent Oral Epidemiol* 2020;48:493-500.
6. Buldur B, Guvendi ON. Conceptual modelling of the factors affecting oral health-related quality of life in children: A path analysis. *Int J Paediatr Dent* 2020;30:181-92.
7. Lai SHF, Wong MLW, Wong HM, McGrath CPI, Yiu CKY. Factors influencing the oral health-related quality of life among children with severe early childhood caries in Hong Kong. *Int J Dent Hyg* 2019;17:350-8.
8. Maharani DA, Adiatman M, Rahardjo A, Burnside G, Pine C. An assessment of the impacts of child oral health in Indonesia and associations with self-esteem, school performance and perceived employability. *BMC Oral Health* 2017;17:65.
9. Li MY, Zhi QH, Zhou Y, Qiu RM, Lin HC. Impact of early childhood caries on oral health-related quality of life of preschool children. *Eur J Paediatr Dent* 2015;16:65-72.
10. Abed R, Bernabe E, Sabbah W. Family impacts of severe dental caries among children in the United Kingdom. *Int J Environ Res Public Health* 2019;17:109.
11. Abanto J, Tsakos G, Paiva SM, Raggio DP, Celiberti P, Bönecker M. Agreement between children aged 5-6 years and their mothers in rating child oral health-related quality of life. *Int J Paediatr Dent* 2014;24:373-9.
12. Rachmawati YL, Pratiwi AN, Maharani DA. Cross-cultural adaptation and psychometric properties of the Indonesia version of the scale of oral health outcomes for 5-year-old children. *J Int Soc Prev Community Dent* 2017;7:75-81.
13. von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP; STROBE Initiative. The strengthening the reporting of observational studies in epidemiology (STROBE) statement: Guidelines for reporting observational studies. *Int J Surg* 2014;12:1495-9.
14. Setiawati F, Sutadi H, Rahardjo A. Relationship between breastfeeding status and early childhood caries prevalence in 6–24 months old children in Jakarta. *J Int Dent Med Res* 2017;10:308-12.
15. Abanto J, Tsakos G, Paiva SM, Goursand D, Raggio DP, Bönecker M. Cross-cultural adaptation and psychometric properties of the Brazilian version of the scale of oral health outcomes for 5-year-old children (SOHO-5). *Health Qual Life Outcomes* 2013;11:16.
16. Achmad MH, Ramadhany S, Mudjari S, Adam AM. Determinant factors of dental caries in Indonesian children age 8–12. *Braz Res Pediatr Dent Integ Clin* 2018;18:e4037.
17. World Health Organization. *Oral Health Surveys: Basic Methods*. 5th ed. Geneva: WHO; 2013.
18. Monse B, Heinrich-Weltzien R, Benzian H, Holmgren C, van Palenstein Helder W. PUFA—an index of clinical consequences of untreated dental caries. *Community Dent Oral Epidemiol* 2010;38:77-82.
19. Saldūnaitė K, Bendoraitienė EA, Slabšinskienė E, Vasiliauskienė I, Andruškevičienė V, Zūbienė J. The role of parental education and socioeconomic status in dental caries prevention among Lithuanian children. *Medicina (Kaunas)* 2014;50:156-61.
20. Begzati A, Bytyci A, Meqa K, Latifi-Xhemajli B, Berisha M. Mothers' behaviours and knowledge related to caries experience of their children. *Oral Health Prev Dent* 2014;12:133-40.
21. Tang R-S, Huang S-T, Chen H-S, Hsiao S-Y, Hu H-Y, Chuang F-H. The association between oral hygiene behavior and knowledge of caregivers of children with severe early childhood caries. *J Dent Sci* 2014;9:277-82.
22. Chaffee BW, Feldens CA, Rodrigues PH, Vitolo MR. Feeding practices in infancy associated with caries incidence in early childhood. *Community Dent Oral Epidemiol* 2015;43:338-48.
23. Quadri MFA, Shubayr MA, Hattan AH, Wafi SA, Jafer AH. Oral hygiene practices among Saudi Arabian children and its relation to their dental caries status. *Int J Dent* 2018;2018:3234970.
24. 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;18:7.
25. Tsakos G, Blair YI, Yusuf H, Wright W, Watt RG, Macpherson LM. Developing a new self-reported scale of oral health outcomes for 5-year-old children (SOHO-5). *Health Qual Life Outcomes* 2012;10:62.
26. Naidu R, Nunn J, Donnelly-Swift E. Oral health-related quality of life and early childhood caries among preschool children in Trinidad. *BMC Oral Health* 2016;16:128.
27. Abanto J, Tsakos G, Paiva SM, Carvalho TS, Raggio DP, Bönecker M. Impact of dental caries and trauma on quality of life among 5- to 6-year-old children: Perceptions of parents and children. *Community Dent Oral Epidemiol* 2014;42:385-94.
28. Mansoori S, Mehta A, Ansari MI. Factors associated with oral health related quality of life of children with severe-early childhood caries. *J Oral Biol Craniofac Res* 2019;9:222-5.
29. Gao SS, Chen KJ, Duangthip D, Chu CH, Lo ECM. Translation and validation of the Chinese version of the scale of oral health outcomes for 5-year-old children. *Int Dent J* 2020;70:201-7.
30. Eiser C, Morse R. Can parents rate their child's health-related quality of life? Results of a systematic review. *Qual Life Res* 2001;10:347-57.