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The Parental Knowledge and Practices to Dental Caries in Children Aged 3-5 Years in Vientiane Lao Pdr.

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ABSTRACT

Background: Maintaining children's oral hygiene from an early age requires continuous attention to preven dental caries, periodontal conditions, and other oral pathology, beginning with the eruption of primary teeth. Early intervention minimizes the risk of caries in permanent dentition, which can be effectively mitigated through appropriate oral health behaviors. However, young children lack the capacity for self-care, necessitating parental guidance and intervention to establish and sustain proper oral hygiene habits

Introduction: The incidence of tooth decay in preschool children is high in Lao PDR. Dietary factors oral hygiene and access to dental services is the main cause of dental caries. Parental knowledge and actions are the main problems that cause tooth decay.

Objective: To study parents' knowledge and practices regarding tooth decay in children aged 3-5 years in kindergartens in Vientiane.

Methods: This study was a cross-sectional study using a form asking parents about oral hygiene. Find the frequency of tooth decay. Using the oral health examination form from the World Health Organization (WHO 2013), data were analyzed using frequency, Chi- Square Test, and T-test to find the relationship between tooth decay and parents' knowledge and practices in children aged 3- 5 years.

Results: There were 400 participants in the study, 289 children were found to have tooth decay, accounting for 72.3%. Mean tooth decay (dmft) = 0.77 (sd = 0.421), d = 0.76 (sd = 0.431), m = 0.10 (sd = 0.297), f = 0.08 (sd = 0.272) 5-year-old group with more than 207 caries 51.7%, 4-year-old group 122 people 30.5%, 3-year-old group 71 people 17.8%, average age of parents 37.38 ± 8.429 years. There is a statistical relationship *P-value = 0.032*. It was found that parents' knowledge and the amount of toothpaste used each time are related to dental caries. A statistically significant *P -value = 0.030*, Parents' practices at age Starting to brush your teeth has a statistically significant association with dental caries at *P-value=0.048* and past toothache in children is associated with dental caries with a statistically significant *P-value <0.001*.

Conclusion: Tooth decay rates are still high. The incidence of tooth decay in children increases with age. It can be seen that the level of parental knowledge is not related to the incidence of tooth decay.

Keywords: Knowledge and practices of parents related to dental caries.

INTRODUCTION

The Oral health represents an integral dimension of systemic well-being and general health. Maintaining optimal oral hygiene and emphasizing preventive care are critical imperatives, as oral diseases impair an individual's capacity to eat, speak, and interact socially without discomfort or pathology, thereby directly impacting overall quality of life [1]. Early childhood constitutes a crucial developmental stage requiring vigilant health monitoring to support optimal physical growth and wellness. Among pediatric populations, dental caries remains a prevalent global public health challenge, causing considerable physiological morbidity and imposing a substantial economic burden on health systems and families. Establishing favorable oral health habits during preschool years serves as a foundational determinant for lifelong oral health trajectories [2]. Epidemiological evidence underscores a persistently high burden of pediatric oral disease in Lao PDR and neighboring regions: Sensambath (2010) reported an Early Childhood Caries (ECC) prevalence of 82% with a mean decayed, missing, and filled teeth (dmft) index of 5.5 among children aged 3 - 4 years in Vientiane Capital [3]. Sayavong (2013) observed an increased prevalence of 92% and a mean dmft of 7.76 in a study examining caries experience alongside growth parameters (height and weight) in children aged 3 - 6 years in Vientiane [4]. MinQuan et al. (2018) demonstrated in a large-scale study (N = 40,360) across China that nocturnal consumption of sugary snacks significantly elevated caries risk. Prevalence rates scaled with age 50.8% at 3 years, 63.6% at 4 years, and 71.9% at 5 years with corresponding mean dmft scores of 2.28, 3.40, and 4.24, respectively [5]. Given the high disease burden and the critical role of primary caregivers in establishing young children's health behaviors, this study aims to evaluate parental knowledge and practices regarding dental caries among children aged 3 - 5 years in kindergartens across Vientiane Capital. The empirical data generated will serve as a baseline to inform preventive strategies, oral health policy planning, and targeted pediatric intervention programs in Lao PDR.

RESEARCH METHODOLOGY

Pediatric Oral Examination: Clinical examinations were conducted using a standardized assessment form derived from the World Health Organization (WHO) Oral Health Surveys: Basic Methods (2013) [6]. Children were examined in a supine position on an examination table or seated upright facing the examiner under natural illumination, utilizing full sets of sterile diagnostic instruments to detect visible carious lesions. The examination team comprised three personnel: the first prepared and sterilized the diagnostic kits; the second a dentist positioned on the patient's right side performed the 5-minute intraoral assessment; and the third recorded, cross-checked, and validated the findings for completeness and accuracy. The intraoral evaluation encompassed soft tissues (oral mucosa, tongue, uvula, and lips), oral hygiene status (dental plaque and calculus), and hard tissues. Dental caries were subsequently evaluated across all tooth surfaces using a dental explorer. This cross-sectional study evaluated 3–5-year-old preschool children at a kindergarten in Vientiane Capital using parental questionnaires paired with oral health examinations. Following data collection, responses and clinical records were systematically verified for accuracy and completeness prior to coding. Statistical analysis was subsequently performed using SPSS (version 25) in alignment with the research objectives. Data were categorized and expressed using descriptive statistics, including frequencies, percentages, means, and standard deviations. To evaluate statistical associations, inferential

analyses were conducted at a 95% confidence level using Chi-square tests and Independent T-tests, with statistical significance set at *P-value* ≤ 0.05.

ETHICAL ASPECTS

This study was approved by the Research Ethics Committee of the Faculty of Dentistry, University of Health Sciences, Laos. un the number: 477

RESULTS

General information for parents

The study included a total of 400 primary caregivers of preschool children. The majority of respondents were mothers (n = 254, 63.5%) and identified as female (n = 275, 68.8%). The mean age of the participants was 37.38 pm 8.43 years (range: 22–71 years). In terms of ethnicity and religion, most participants belonged to the Lao ethnic group (n = 382, 95.5%) and practiced Buddhism (n = 381, 95.3%). Regarding educational attainment, 137 caregivers (34.3%) held a bachelor's degree or higher. Occupationally, the largest proportion were private/government employees (n = 177, 44.3%). Comprehensive demographic characteristics are summarized in **Table 1**.

Variable	Statistic	Number (n)	Percent (%)
Age	Mean ± SD Range	37.38 ± 8.43	—
Gender	Female	275	68.8%
Relationship to Child	Mother	254	63.5%
Ethnicity	Lao	382	95.5%
Religion	Buddhism	381	95.3%
Education	Bachelor's degree	137	34.3%
Occupation	Private/government	177	44.3%

General information of child

Among the surveyed children (n = 400), 213 were female (53.3%). The mean age was 4.34 years (SD ± 0.76). The majority of participants were 5 years old (n = 207, 51.7%), followed by 4-year-olds (n = 122, 30.5%) and 3 year-olds (n = 71, 17.8%). Detailed demographic characteristics are presented in **Table 2**

Demographic Characteristic	Frequency (n)		Percent (%)
Sex			
Female	214		53.3
Male	187		46.7
Age			
3 years old	71		17.8
4 years old	122		30.5
5 years old	207		51.7
Age Summary	**Mean**	**Sd**	
	4.34	**±0.76**	

General information of the municipality and outside the municipality

Regarding geographic distribution, half of the participants resided within the municipality (n = 200, 50.0%) and half resided outside the municipality (n = 200, 50.0%). In terms of institutional background, the majority were enrolled in public schools (n = 243, 60.8%), while private school students accounted for 39.3% (n = 157). Full demographic details are provided in **Table 3**

Variable	Frequency (n)	Percent (%)
Districts		
Municipal District	200	50
Outside Municipality	200	50
Schools		
Government school	243	60.8
Private school	157	39.3

Parents' knowledge about dental caries

The majority of children preferred sweet foods and snacks (n = 299, 74.8%), followed by a secondary group (n = 88, 22.0%). In terms of oral health literacy and hygiene practices, most parents demonstrated accurate knowledge across several indicators. A high proportion of respondents recognized that toothbrushes should be used individually (n = 395, 98.8%) and replaced every three months (n = 325, 81.3%). Furthermore, 75.0% (n = 300) understood that fluoride toothpaste is effective in preventing dental caries. Regarding application and post-snack hygiene, 55.8% (n = 223) correctly identified the recommended pea-sized amount of toothpaste per use, while 41.0% (n = 164) reported rinsing their child's mouth with plain water after consuming sweets or snacks. Show in **Table 4**

Assessment Category	Variable	Frequency (n)	Percentage (%)
Child Dietary Preference	Sweet foods/snacks preferred	299	74.8
	Secondary preference	88	22
Oral Hygiene Knowledge & Practices	Recommends replacing toothbrush every 3 months	325	81.3
	Advises individual use of toothbrushes	395	98.8
	Recognizes fluoride toothpaste prevents dental caries	300	75
	Uses a pea-sized amount of toothpaste	223	55.8
	Rinses child's mouth with water post-snack consumption	164	41

Parental Practices

The study Parental Practices pediatric oral hygiene behaviors, almost all children engaged in toothbrushing (n = 395, 98.8%), with the initiation age starting at two years old, and 63.2% (n = 253) performing the activity independently. In terms of daily frequency and timing, 47.3% (n = 189) brushed twice daily, while 83.5% (n = 330) brushed during both morning and evening hours. Parental involvement was moderate: 65.5% of parents (n = 262) actively instructed their children through explanation and demonstration, and 52.0% (n = 208) inspected their child's teeth post-brushing. Regarding dental care utilization, 27.3% (n = 109) of children attended an annual dental visit, whereas over half (n = 212, 53.0%) had never been taken to a dentist. A total of 210 children (52.5%) suffered from toothaches; however, among those affected, only 38.1% (n = 80) were brought to a dental professional for care .

Category	Practice	Frequency (n)	Percentage (%)
Toothbrushing Habits	Children brush their teeth	395	98.8
	Children brush independently	253	63.2
	Started toothbrushing at 2 years of age	—	—
	Brush twice daily	189	47.3
	Brush morning and evening	330	83.5
Parental Supervision	Explained and demonstrated toothbrushing technique	262	65.5
	Inspected teeth following child's brushing	208	52
Dental Visits & Pain Management	Visit dentist once per year	109	27.3
	Never taken to a dentist	212	53
	Experienced toothaches	210	52.5
	Sought dental care when toothache occurred	80	38.1

Prevalence of dental caries

Clinical examinations were conducted on a sample of 400 pediatric participants (N = 400). The overall prevalence of dental caries within the cohort was 72.3% (n = 289). Regarding caries severity in the primary dentition, the mean decayed, missing, and filled teeth index (dmft) was 0.77, Sd = 0.421/ teeth per person **Table 6**.

Variable	Category / Metric	Value
Total Examined	Sample Size (N)	400
Caries Status	Present (n, %)	289 (72.3%)
	Absent (n, %)	111 (27.7%)
daft Index	Mean ± SD	0.77 ± 0.42
	Unit	Teeth/person

Relationship between dental caries and demographic information of parents

The results of analysis revealed that parental age (37.38 ± 8.43 years) demonstrated a statistically significant association with dental caries (p = 0.032). Conversely, no statistically significant associations were identified between dental caries and the following variables: primary school location, relationship to the child, gender,

ethnicity, religion, occupation, educational level, or family size ($p > 0.05$). Detailed results are presented in **Table 7.1** and 7.2

Variable	Category	Dental Caries No, n (%)	Dental Caries Yes, n (%)	Total, n (%)	P-value
School	Government school	68 (61.3)	175 (60.6)	243 (60.8)	0.897
	Private school	43 (38.7)	144 (39.4)	157 (39.3)	
School Location	In city	56 (50.5)	144 (49.8)	200 (50.0)	0.911
	Outside city	55 (49.5)	145 (50.2)	200 (50.0)	
Relationship with Child	Father	32 (28.8)	83 (28.7)	115 (28.7)	0.602
	Mother	73 (65.8)	181 (62.6)	254 (63.5)	
	Grandparent	5 (4.5)	16 (5.5)	21 (5.3)	
	Uncle	1 (0.9)	9 (3.1)	10 (2.5)	

Table: 7.2

Variable	Category	Dental Caries No, n (%)	Dental Caries Yes, n (%)	Total, n (%)	P-value
Parent's Gender	Female	76 (68.5)	199 (68.9)	275 (68.8)	**0.94**
	Male	35 (31.5)	90 (31.1)	125 (31.1)	
Age of Parents	Mean ± SD = 37.38 ± 8.429 years	—	—	—	**0.032**
Ethnicity	Lao	107 (96.4)	275 (95.2)	382 (95.5)	**0.46**
	Hmong	4 (3.6)	10 (3.5)	14 (3.5)	
	Kummu	0 (0.0)	4 (1.4)	4 (1.0)	
Religion	Buddhist	107 (96.4)	274 (94.8)	381 (95.3)	**0.712**
	Spiritualism	4 (3.6)	14 (4.8)	18 (4.5)	
	Christian	0 (0.0)	1 (0.3)	1 (0.3)	

Relationship between dental caries and general information of children

The results of the study found that the age and gender of the child were not statistically related to dental caries, at P- value >0.05, see table for details

Table: 8 Relationship between dental caries and general information of children

Variable	Category / Metric	Dental Caries No, n (%)	Dental Caries Yes, n (%)	Total, n (%)	P-value
Age	Mean ± SD = 2.24 ± 0.786 years	—	—	—	**0.385**
Gender	Female	66 (59.5)	147 (50.9)	213 (53.3)	**0.123**
	Male	45 (40.5)	142 (49.1)	187 (46.7)	

Relationship between dental caries and parental knowledge factors

The results of the study on the relationship between knowledge and dental caries found

- Significant Predictor: The amount of toothpaste used per brushing session demonstrated a statistically significant association with the presence of dental caries in children ($P = 0.030$). The majority of participants (59.5%, n = 172) reported using less than a pea-sized amount of toothpaste, followed by 30.4% (n = 88) using less than half a toothbrush head, and 10.0% (n = 29) using a full toothbrush head of toothpaste.

- Non-Significant Predictors: No statistically significant associations were observed between childhood dental caries and caregivers' or children's knowledge of cariogenic foods, duration of toothbrushing, use of an appropriate toothbrush, use of fluoridated toothpaste, or post-snack oral hygiene practices ($P > 0.05$ for all).

Table 9.1 and 9.2

Variable	Category	Dental Caries No, n (%)	Dental Caries Yes, n (%)	Total, n (%)	P-value
Foods that cause dental caries	Chocolate	23 (20.7)	65 (22.5)	88 (22.0)	**0.739**
	Sweets	84 (75.7)	215 (74.4)	299 (74.8)	
	Cake	2 (1.8)	7 (2.4)	9 (2.3)	
	Fruit	2 (1.8)	2 (0.7)	4 (1.0)	
Changing toothbrushes	Every 3 months	89 (80.2)	236 (81.7)	325 (81.3)	**0.972**
	Every 6 months	11 (9.9)	25 (8.7)	36 (9.0)	
	Until it breaks	7 (6.3)	19 (6.6)	26 (6.5)	
	Don't know	4 (3.6)	9 (3.1)	13 (3.3)	
Using a good toothbrush	Use yourself	111 (100.0)	284 (98.3)	395 (98.8)	**0.378**
	Share with family	0 (0.0)	2 (0.7)	2 (0.5)	
	Don't know	0 (0.0)	3 (1.0)	3 (0.8)	
Using fluoride toothpaste that can prevent dental caries	Can	90 (81.1)	210 (72.7)	300 (75.0)	**0.08**

	Can't	7 (6.3)	14 (4.8)	21 (5.3)	
	Don't know	14 (12.6)	65 (22.5)	79 (19.8)	

Table: 9.2

Variable	Category	Dental Caries No, n (%)	Dental Caries Yes, n (%)	Total, n (%)	P-value
Amount of toothpaste used per time	Size of a pea	51 (45.9)	172 (59.5)	223 (55.8)	**0.03**
	Half of brush	49 (44.1)	88 (30.4)	137 (34.3)	
	Full toothbrush	11 (9.9)	29 (10.0)	40 (10.0)	
After eating candy or snacks, clean the mouth	Not done	28 (25.2)	84 (29.1)	112 (28.0)	**0.732**
	Rinse mouth with water	48 (43.2)	116 (40.1)	164 (41.0)	
	Brush teeth	35 (31.5)	89 (30.8)	124 (31.0)	

Relationship between factors and dental caries

The results of the correlation test found that the average age of the child's parents was 37.38 years ± 8.429 years, the amount of toothpaste used per time was 29 (10.0%), the amount of toothpaste used was less than half of the toothbrush in 88 (30.4%) and less than the amount of a pea in 172 (59.5%), the average age at which children started brushing their teeth was 2.24 years ± 0.786 years, and the child's previous toothache was 188 (65.1%) and 101 (34.9%) had never had a toothache. There was a statistical relationship with dental caries at P-value<0.05, show in

Table 10.

Variable	Category / Metric	Dental Caries No, n (%)	Dental Caries Yes, n (%)	Total, n (%)	P-value
Age of parent	Mean ± SD = 37.38 ± 8.429 years	—	—	—	**0.032**
Amount of toothpaste used per time	Pea-sized	51 (45.9)	172 (59.5)	223 (55.8)	**0.03**
	Half of toothbrush	49 (44.1)	88 (30.4)	137 (34.3)	
	Full toothbrush	11 (9.9)	29 (10.0)	40 (10.0)	
Age started brushing	Mean ± SD = 2.24 ± 0.786 years	—	—	—	**0.048**

History of toothache	No	89 (80.2)	101 (34.9)	190 (47.5)	**<0.001**
	Yes	22 (19.8)	188 (65.1)	210 2.5)	

DISCUSSION

From a study evaluating the knowledge and practices of parents regarding children aged 3 - 5 years in Vientiane Capital (N = 400, sampled across urban and suburban districts), the overall prevalence of primary tooth caries was 72.3% (n = 289). Age-specific caries prevalence rates were recorded as follows: 3-year-olds: 17.8%, 4-year-olds: 30.5%, 5-year-olds: 51.7%.The mean values for the individual index components and overall index were: Decayed teeth (d): 0.76 ± 0.431, Missing teeth (m): 0.10 ± 0.297, Filled teeth (f): 0.08 ± 0.272, Overall dmft index: 0.77 ± 0.421. In comparison, a 2013 study on the relationship between dental caries and anthropometric measurements (height and weight) by Dr. Sangwan Sayavong revealed a higher caries prevalence of 92% with a mean dmft score of 7.76 teeth/child among children aged 3 - 6 years [7]. Similarly, a 2010 study by Dr. Sakpaseuth Sensambath investigating early childhood caries and associated risk factors among children aged 3 - 4 years in Vientiane, Lao PDR, reported a caries prevalence of 82% and a mean dmft index of 5.5 teeth/child [5,8]. In the study by Boonyawong (2022), the overall caries prevalence among children was 80.8%, with a mean dmft index of 8.3 teeth/child. Specifically, 5-year-old children exhibited a caries prevalence rate reaching 84.6%, with an elevated mean dmft score of 8.9 teeth/child [9].Comparison with Regional and International FindingsChina (Mingshan et al., 2022): In comparison, Mingshan and colleagues reported lower values among children aged 3–5 years, with a caries prevalence of 74.3% and a mean dmft index of 4.7 ± 5.0 teeth/child.Vientiane Capital (Vongxay, 2021): A study by Dr. Chanthaphone Vongxay among children aged 1- 5 years across private and public kindergartens as well as households in Vientiane Capital demonstrated a caries prevalence exceeding 72%, with a mean dmft score of 6.0 teeth/child [10]. Xaythany District, Lao PDR (Vatthavisak, 2019): Dr. Viengphachan Vatthavisak evaluated oral health status among preschool children aged 3- 5 years alongside caregiver knowledge and practices in Xaythany District, Vientiane Capital. The investigation revealed a caries prevalence of 71.4% and a mean dmft score of 4.99 teeth/child [11].Tunisia (Chouchene et al., 2022): Conversely, Chouchene and team investigated caries incidence and associated risk factors among children aged 4–5 years in Tunisia, reporting a caries prevalence greater than 20% and a substantially lower mean dmft index of 0.89 teeth/child [12]. Findings by Hui Bin et al. (2017) demonstrated that nighttime brushing prior to sleep and parental assistance during toothbrushing were significantly associated with caries status ($P < 0.01$). Additionally, the age at which toothbrushing was initiated was significantly correlated with dental caries occurrence ($P = 0.05$) [13].Impact of Maternal Education and Parental SupervisionSudan (Sudan University, 2016): An investigation evaluating maternal knowledge and practices regarding preschool children aged 3- 5 years included 394 mothers (94% response rate), aged 20 - 40 years. Among the participants, 52.7% had attained university-level education, and 63.7% were homemakers. Mothers demonstrated high knowledge scores (mean ± SD = 7.22 1. 42) and practical management scores (mean ± SD = 41.3 ±11.8). Maternal education level was significantly associated with both oral health knowledge and oral hygiene practices ($P < 0.001$ [14].Saudi Arabia (Riyadh, 2021): In a KAP assessment involving 384 parents (predominantly mothers, 91.9%; 61.5% aged 30–39 years), 89.1% reported that their children brushed their teeth twice daily using fluoridated toothpaste as the optimal cleaning method. Furthermore, 80.7% of parents actively

supervised and guided their children during toothbrushing. Regarding awareness, 99.2% acknowledged the importance of primary dentition, and 70.8%$recognized that pathological conditions in primary teeth could adversely affect succedaneous permanent teeth [15]. Association with Prior Pain and AgeMorocco (Chala et al., 2018): In a study investigating self-reported maternal knowledge, attitudes, and practices in relation to pediatric oral health, advancing child age was significantly associated with caries risk ($P < 0.001$). Furthermore, a history of pediatric dental pain showed a statistically significant association with caries experience ($P = 0.005$) [16].

CONCLUSION

This study was a cross-sectional study with the aim of studying the knowledge and practices of parents regarding the dental condition of kindergarten children in Vientiane Capital. The data collection method was a questionnaire from parents and actual oral health examinations of 400 children in 8 kindergartens, including public and private schools from 2 districts: Chanthabouly District and Pak Ngum District in Vientiane Capital.The results of this study: It can be concluded that the prevalence of deciduous teeth with dental caries was 72.3%, of which 5-year-olds had an average of 51.7%, 4-year-olds had an average of 30.5%, and 3-year-olds had an average of 17.8%, and the dental caries index d = 0.76, sd = 0.431; missing tooth index m = 0.10, sd = 0.297; The dental occlusion index f = 0.08, sd = 0.272; the mean dental caries index dmft = 0.77, sd = 0.421, found that the age of the parents was related to the occurrence of dental caries with a P-value = 0.032, the knowledge of the parents about the amount of toothpaste used each time was statistically related to the occurrence of dental caries with a P-value = 0.030, the parents' practice regarding the age at which children started brushing their teeth and the child's previous toothache had a statistical relationship with a P-value<0.0

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