Original Research Article

DEVELOPMENT OF AN EDUCATION INTERVENTION FOR PARENTS TO IMPROVE ORAL HEALTH OF CHILDREN IN VIENTIANE PROVINCE, LAO P.D.R.

Abstract

Background: Dental caries is a major problem in young children worldwide, particularly in Southeast Asia the prevalence of dental caries among preschool children is very high. Besides, parents are playing an important role in the development of caries in children.
Objective: The aim of this study was to evaluate dental education intervention for parents to improve oral health of children in Vientiane Province, Lao P.D.R. (Laos).
Methods: This is a cohort study with a follow-up period of 3 months ~~(May-September, 2023)~~ in two kindergartens in Vientiane province. Using modified oral health literacy and behavioral questionnaires to interview the parental/guardian; then giving the education intervention. The oral health examination of all preschoolers was observed.
Results: A total of 218 children, 117 (53.70%) were boys and 101 (46.30%) were girls. The prevalence of dental caries was 69.30% and the decayed, missing and filled teeth (dmft) index was 3.88 at baseline, then increased to 4.67 in the final survey. On the other side, the pulpal involvement, ulceration, fistula and abscess (pufa) index was decreasing from 1.56 to 1.31 after intervention. Besides, the guardians who participated in the survey were mostly father/mother (90.80%), their average age was 35.79 (± 6.70) years old. There was a significant difference in the level of parental oral health knowledge, behavior and practices after intervention (t = 5.41, 95% CI = 2.10-4.50, $p < 0.001$).
Conclusion: The result of this investigation suggests that ~~the~~ dental education intervention for parents is an importance source to enhance the oral health knowledge, behavior and parental practices. Although, the severity of dental caries in young children was still poor. Thus, the oral health education and prevention programs are necessary to implement in kindergartens.

Keywords: dental education, intervention, dental caries, young children, ~~Vientiane Province~~

1. Introduction

Dental caries is a major problem in young children worldwide, particularly in Southeast Asia the prevalence of dental caries among preschool children is very high (79%) [1]. Also, a longitudinal study in Cambodia, Indonesia and Lao PDR reported the prevalence of dental caries and odontogenic infections in the primary dentition was 94.40% and 69.20% respectively [2]. To date, many studies presented the severity of dental caries in preschooler and young children vary from 73.30% to 94.90% in Laos including the Lao National Oral Health Survey in 2013 [3-8]. Besides, parents are playing an important role in the development of caries in children [9],

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dental caries does not only increase the disease burden and cause much pain and suffering for young children, as there is growing evidence that severe dental caries affects the height and weight of children. Also, it has been shown that large levels of untreated dental caries can interfere with child growth and development [10-12]. So, the oral health educational based on the theory of planned might serve them to enhance their oral health care and children's [13]. Also, the burden of oral disease among primary school children in low- and middle-income countries could be decreased by implementing school-based interventions [14]. Likewise, the twenty-two primary schools in Vientiane Capital, Laos had been obtained the Fit for school programme for a period of two years [2]. Nevertheless, the interventions of oral health knowledge, behavior and practices of parental/guardian among preschool children have ever been conducted ~~yet~~ in Laos.

Vientiane province is located in the northwest of the country nearby Vientiane Capital including 11 districts with approximately 470,000 populations [15], unfortunately there are not any oral health surveys among young children. Therefore, the aim of the present study was to evaluate dental education intervention for parents to improve oral health of children in Vientiane Province, Lao P.D.R.; and the objectives were: (1) To describe changes in terms of oral health knowledge, behaviors and parental practices over a period of 3 months after obtaining dental education intervention; (2) to investigate the difference of children's oral health status before and after dental education obtained to their parents; and (3) to determine any risk factors of dental caries development in children.

2. Methodology

a. Study design:

The preliminary survey and a follow-up survey were conducted in May and September 2023 in Vientiane Province. The Phonemee and Provincial (Mittaphab) kindergartens in Viengkham district were selected by convenience sampling methods and had been permitted by the Department of Education of Viengkham District. All preschoolers aged 36-60 months who were enrolled in ~~selected~~ kindergartens in 2023 and their parental/guardian ~~were willing to participate to the study and signed the~~ informed consent forms were recruited as study participants.

b. Sample size calculation:

The sample size was calculated according to the national prevalence of dental caries among children aged 3 years old is 73.30% (Paik et al., 2013) with 90% power and a significance level of 5%, so the sample size was estimated 206 children.

$$n = \frac{FP(100-P)}{d^2} \approx 206 \text{ children (P=73.3\%; d=10\%; F=10.51)}$$

Thus, there were 218 preschoolers with their parental/guardian ~~were~~ recruited at the preliminary and completed the final survey.

c. Data collection methods:

Data were measured through a face-to-face questionnaire of the parent/guardian and clinical oral examination of their children at baseline ~~(May 2023)~~ and three months after intervention ~~(September 2023)~~.

The questionnaire ~~was~~ consisted of three parts including demographic data, oral health knowledge, behavior and practices. The first part, there was the demographic characteristics of the parental/guardian including age, education level and employment. In the second part, the oral health knowledge was measured with 15 questions. All responses were scored from 1 (strongly disagree) to 5 (strongly agree). And the final part, the oral health behavior and practices of the parents and their children were measured with 8 questions (6 items for parents and 2 items for children). The possible score range was 0-9 and the higher score indicated ~~the~~ high level of oral behavior and practices.

For intervention, the researcher has given short explanation to the parental/guardian about the importance of oral health care for young children and how to take care it using model practicing and question-answers (if they had). At the same time, the brochure and video contents of primary teeth development and how to prevent dental caries for young children were delivered to parents (A brochure was developed and proofed by the Faculty of Dentistry, University of Health Sciences/ a video was produced by Colgate-Palmolive company).

Regarding ~~to~~ the clinical oral examination of children form used were modified versions of the World Health Organization assessment (WHO) form 1997 and the data on caries had been collected worldwide using the DMFT/dmft - index, which reports caries severity and prevalence based on a count of teeth which were decayed (D/d), missing due to caries (M/m), or filled (F/f). This classical index provided information on caries experience and restorative and surgical treatment [16]. The pufa index was the new index to evaluate the prevalence and severity of oral conditions resulting from

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untreated dental caries. The pufa index will also ~~be~~ used to record the number of teeth which were pulpal involved. This index record: Pulpal exposure (P/p) Ulceration (U/u) Fistula (F/f) Abscess (A/a) [17]. For clinical oral examination, participants were lying on the table in a supine position. The examiners carry out a headlamp were fully gloved and wore a mask.

All instruments were packed in sterile packages and a new package of instruments (single use) was used for each subject along with sterile gloves to prevent any possible cross-infection between subjects and between examiner and the subjects.

Height and weight measurement were made using a pediatric height and weight measurement apparatus specifically designed to accurately measure the height and weight of small children.

d. Statistical method:

Dental caries: The mean number of decayed, missing and filled teeth for primary were calculated based on the detection codes assigned to for each tooth. The percentage of children with a dmft score equal or greater than one was used to calculate severity of dental caries. And the pufa index was scored and calculated ~~same~~ as dmft index.

SPSS version 22 (SPSS, Inc., Chicago, IL, USA) statistical software was used to analyze the data. Descriptive statistics were performed using means and standard deviation or median, range and frequencies. Different significant tests were used to compare oral self-care behaviors score at the preliminary and final survey.

e. Ethics statement

The protocol of the study was reviewed and approved by the Research Ethics Committee of University of Health Sciences, Lao PDR. (No. 495/REC, dated: 6th April, 2023) before the study began. Written informed consent was obtained from the guardians of the preschooler prior to the survey.

3. Results

A total of 218 children, 117 (53.70%) were boys and 101 (46.30%) were girls (table 1). Among those, the guardians who participated in the survey were mostly father/mother (90.80%), their average age was 35.79 (± 6.70) with the interquartile range from 19 to 65 years old. About 17.90% of the guardians had completed college/university, 34.90% completed high school and only 6% was illiteracy. The most common occupation was government employed (45%), followed by farmer (26.60%), worker (14.20%), business/self-employed (11.40%) and others (1.80%) respectively see in table 2.

At the preliminary, the level of oral health knowledge of parental/guardian was 42.70%, which increased in the final survey (60.60%, $p < 0.001$). It showed that there was a significant difference in the level of parental oral health knowledge after intervention. Also, the mean score of parental oral health behavior and practices were statistically increasing after the education intervention; which was only 36.70% at baseline and increased to 48.60% ($p < 0.001$) in three months later as shown in table 3.

The prevalence of dental caries was 69.30% and the dmft index was 3.88 at the preliminary, then increased to 4.67 in the final survey. On the other side, the pufa index was decreasing from 1.56 to 1.31 after intervention. Overall, there was no significant difference of oral health status of children after dental education obtained to their parents ($p > 0.001$) see in table 4.

There was no difference of children's height average in a 3 months follow-up, but the average of weight decreased from 15.73 to 14.83 kg (see in table 5).

There was a correlation between the pufa index of children and parental oral health knowledge at baseline ($p = 0.043$). After intervention, the dmft index was associated with parental behavior and practices ($p = 0.047$). However, there were no relationship between parental education level and their child oral health status.

4. Discussion

Tooth decay is a worldwide public health problem and toothache and dental sepsis is common worldwide [18]. The prevalence of untreated dental caries in children particularly in the deciduous (primary) dentition is extremely high in many developing countries, which is concerning from a general health and well-being point of view. A review of the dental literature reveals that 95% of the decayed primary teeth of children of low-income African and Asian nations remain untreated [19].

The present study demonstrated that the dental caries prevalence in preschool children aged 3-5 years old was 69.30%, which was lower than the Lao national oral health survey in 2013 (73.30%) [8]. The prevalence of dental caries in 3-4 years old children in Vientiane capital was 82% and the

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dmft index was 5.50 that were higher than the current results [7]. These differences might occur due to socioeconomic status, health education, environments, lifestyles, and family background. Besides, the Thai national oral health reported 75.60% of caries in the primary dentition [20] and the caries prevalence in preschool children in Samut Sakhone Province, Thailand was 80.80% and mean of dmft was 8.20 [21] that were higher than the current study too.

Additionally, the parental/guardian's education level was one of the most common risk factors for dental caries among young children [1, 12, 21, 22]. In contrast ~~with~~ our study showed that the oral health status of preschoolers and their parents' education level were relatively negative.

Similar to the findings of previous study [13], ~~in the current study~~, after intervention, the mean score of perceived behavioral and parental practices was increased significantly. This finding is also consistent with ~~a similar previous~~ study by Pan, Cai [23] that found the effective of oral health knowledge, behaviors and parental practices among migrant children in one year follow up.

There are several limitations. First, this was a prospective study with short duration of intervention, it was unable to indicate the relationship between the parents' behavior and their children's dental caries. Second, there were 11 districts in Vientiane province, only two public kindergartens with small sample size in Viengkham District were purposively selected. Therefore, the results of the present study could not represent the preschool children and their parents in the province. Third, the calibration was not carried out, there was no data of the level of agreement on diagnosis between and within the dentists. Without calibration, the compromises might be appeared in the findings of the present study. Finally, the behavioral questionnaire of parental/guardian was performed by question-and-answer method without observations, there was not consist of eating behavior either parent or their child.

5. Conclusion

The result of this investigation suggests that the dental education intervention for parents is an importance source to enhance the oral health knowledge, behavior and parental practices. Although, the severity of dental caries in young children was still poor. Thus, the oral health education and prevention programs are necessary to implement in kindergartens.

A longitudinal or quasi-experimental study will be needed to accomplish the education intervention program for parents that affect to oral health of children. In addition, the intervention model would be more effective if the parent/guardian and community participate in designing. Together with long term follow-up maybe detect any changes of outcome (~~dental caries and practice).~~

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6. References

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~~**Tables 1-5**~~

Table 1: Demographic data of children by age group and sex.

Age/sex	Boy	Girl	Total
3 years old	31	17	48
4 years old	45	43	88
5 years old	41	41	82

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2) spell out all the authors name in your reference, not just be lazy and put 'et al'. Your references need to be cross-checked

3)please standardise the format of writing especially when citing books vs journals

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5) even after copy-paste, there are still formatting issue from reference list number 15 onwards

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Total	117 (53.70%)	101 (46.30%)	218 (100%)

Table 2: Socio-demographic data of parent/guardians

1. Age	35.79 (± 6.70) 19-65 years old	
2. Sex	Male	80 (36.70%)
	Female	138 (63.30%)
3. Education Levels	Illiteracy	13 (6.00%)
	Primary school	21 (9.60%)
	Secondary school	65 (29.80%)
	High school	**76 (34.90%)**
	College/University	39 (17.90%)
	Others	4 (1.80%)
4. Occupations	Government employed	**98 (45.00%)**
	Business/ self-employed	25 (11.50%)
	Farmer	58 (26.60%)
	Worker	31 (14.20%)
	Others	6 (2.70%)
5. Relationship to a child	Father/ mother	**198 (90.80%)**
	Grandfather/ grandmother	13 (6.00%)
	Uncle/ aunt	6 (2.80%)
	Others	1 (0.40%)

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Table 3: Oral health knowledge, behavior and practices of parent or guardians

Variables		Before n=218(%)	After n=218(%)	Paired T-test
Oral Health Knowledge of Parents				
Low/moderate level (≤80%, 21-56 points)		125 (57.30%)	86 (39.40%)	Mean difference:3.30 t = 5.41
High level (>80%, 57-70 points)		93 (42.70%)	132 (60.60%)	95% CI = 2.10-4.50 *p* < 0.001
	Mean	54.81	58.12	
	SD	6.88	6.03	
	Min-Max	21-70	46-72	
Oral Behavior and Practice of Parents				
Low/moderate level (≤ 60%, 2-9 points)		138 (63.30%)	112 (51.40%)	Mean difference:0.93 t = 3.74
High level (> 60%, 10-15 points)		80 (36.70%)	106 (48.60%)	95% CI = 0.40-1.40 *p* < 0.001
	Mean	8.52	9.45	
	SD	2.54	2.23	
	Min-Max	2-15	3-25	

Table 4: The Oral Health Status of Children

Variables	Before	After	P-value
dmft index dt	3.88 3.72 (69.30%)	4.67 3.78 (66.50%)	> 0.001
pufa index	1.56 (41.30%)	1.31 (30.30%)	> 0.001

Table 5: Height and weight of children

	Before intervention	After intervention
Height (cm)	103	103
Weight (kg)	15.73	14.83

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