CHAPTER III

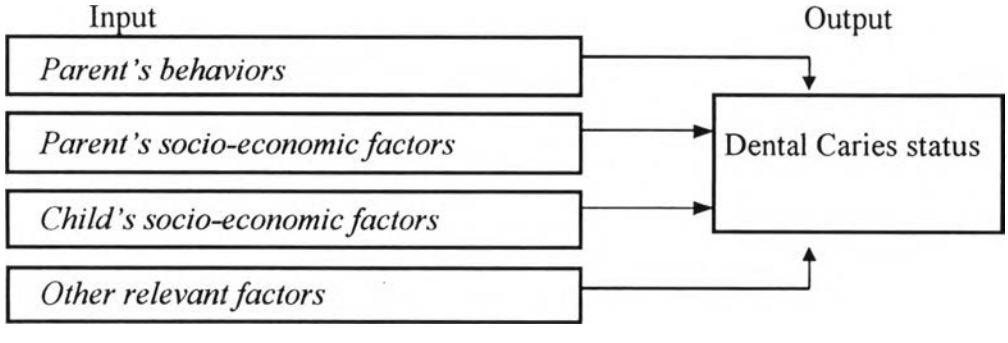
Data Exercise :

The Policy Simulation of Dental Caries Prevention

Introduction

Before a planner develops any new strategies or continues the present strategies, the planner should evaluate the present situation. This exercise contributes both qualitative and quantitative data collecting methods. The aims of this study are to analyze the correlation of influencing factors to dental caries status, and select the significant factor, which can be implemented as an intervention to test the policy simulation. Qualitative data collection was done to describe the parents' behavior and dental health service activities and to determine the feasibility and costs of the intervention.

Figure 4.1 Conceptual framework of factors influencing dental caries status



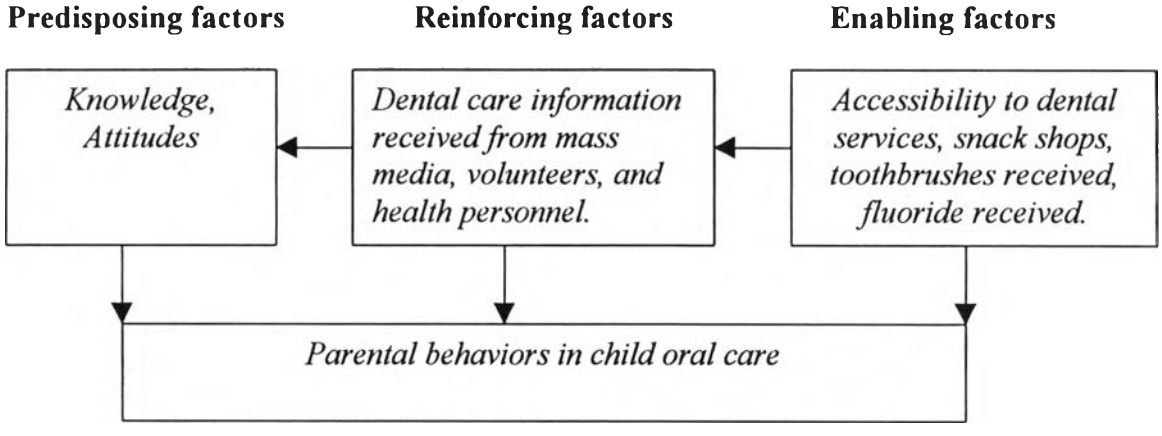
Demers et al. reviewed that many studies have shown influencing factors on children dental caries (Demers et al., 1990). Base on my assumption the main factors are socio-economic status of children and parents, and parent's behaviors (Figure 4.1). The aim of the public caries prevention program is to promote favorable parental behaviors in taking care of their children. Parental behaviors affecting children's dental caries status are dietary feeding habits, oral cleansing habits, and fluoride supplement compliance (Chaiyut Siriviboonkiti, 1994; Grindefjord et al., 1996).

A planning model, which provides a structure for identifying the process of health behavior intervention, is the PRECEDE-PROCEED model. Based on the PRECEDE-PROCEED model, which originated in the 1970s and was developed by Green and Kreuter. The factors that initiate and sustain the change of behaviors are classified to three groups: predisposing, reinforcing, and enabling factors. (Gielen and McDonald, 1996). This exercise applied this model because it facilitates consideration of both individual and environmental factors that influence health and health behaviors.

This exercise applied this model to describe parents' behaviors in dental care of children in figure 4.2. The predisposing factors are knowledge and attitude toward children's dental visits. The reinforcing factors are dental care information received from mass media, health personnel and volunteers. The enabling factors are accessibility to dental services, snack shops, shops selling dental hygiene tools, and receiving toothbrushes from staff; and receiving fluoride supplements (Figure 4.2). This analysis focused on the association between child dental caries status and the

previous intervention which are reinforcing and enabling factors to parent's behaviors.

Figure 4.2 Factors influencing parental behaviors



A study in Saraphi District, Chiang Mai Province, showed that Dental health knowledge and beliefs toward baby oral care had positive relationship to parental behavior in child oral care at a 0.01 significant level (Thasanee Mahawan, 1997). Furthermore, the reinforcing factor - information received from mass media - had positive effects on dental health care behaviors of parents at the 0.1 significant level, too. The enabling factors which are accessibility to dental services, snack shops were not associated to parent's practice about child oral care (Thasanee Mahawan). A study of mother's practice about child oral care including bottle feeding habits, giving sweets, and baby's teeth cleansing habits showed statistically significant differences by dental educational experience (Tinakorn Jongkittinarukorn, 1995).

This exercise had 2 studies separated by collecting data method. That was quantitative part and qualitative part.

Quantitative part

1. Objectives of quantitative study

- Analyze the correlation of influencing factors to dental caries status of preschool children in Khon Kaen Province.
- Evaluate the existing caries prevention of preschool children in Khon Kaen Province.
- Test the policy simulation.

2. Research question of quantitative study

- How many decayed-missing-filled surfaces of sample group?
- What are socioeconomic status of sample population and their parent?
- How do parents practice in child oral care?
- Do the sample children and their parents received any service such as knowledge about oral care, fluoride, toothbrush?
- Do the services received correlate to child dental caries status?
- Are there any confounded correlate to child dental caries status and what?
- How many percents of caries reduction when simulate an effective intervention?

3. Materials and Methods of quantitative study

3.1. Data collection

This exercise used cross sectional data. Quantitative data obtained from Khon Kaen Provincial Oral Health Survey in June 1996 by the Dental Health section of Khon Kaen Provincial Health Office was analyzed. I participated in that survey as a chairman of survey committee. The purpose of the Khon Kaen oral health survey was to study the prevalence of common oral diseases and evaluate caries prevention programs in preschool children. The data consisted of the oral health status of children aged three and five- to six-year-old group representative of preschool children in Khon Kaen Province, knowledge, attitudes and practice of parents. Questionnaires were completed through interviews. Dental caries status was examined by dentists, which were calibrated to the standard.

A group of three-year-olds (N=232) represented the early stage after the last primary tooth eruption. A group of five- and six-year-olds (N=238) represented the late stage of primary dentition before progression to mixed dentition of primary and permanent teeth.

3.2. Sample design

Case selection of Khon Kaen oral health survey was stratified multistage. First, eight districts were selected from 24 districts by systematic sampling; second, selecting 16 sub-districts by systematic sampling which ordered urban areas of all

districts and follow with rural areas; third, selecting 32 villages by systematic sampling with proportion to size. A quota of children per village from each age group was examined and their parents were interviewed. Baseline data from the list of districts, sub-districts, and villages of Khon Kaen Province were used for sampling. The sample size was calculated to represent the children's population by this formula:

$$n = \frac{Z^2pq}{d^2} * \text{design effect}$$

Z = 1.96 ($\alpha = 0.05$).

p = 0.61 and 0.84

(Caries prevalence of three- and five-year-olds group respectively in 1991).

q = (1 - p).

d = acceptable error = 7 -13 percent of P.

design effect=1.5.

3.3. Quantitative data analysis

Data processing used Epi-info Program and the data converted for analysis by SPSS/PC Program. Data analysis was divided into two parts: descriptive overview and econometrics analysis. The first part used descriptive statistic by frequency and mean in order to describe the overview of sample population characteristics. The second part was econometric model analysis. Econometrics is the science of model building consisting of a set of tools which are used to construct and then test mathematical representations of portions of the real world (Pindyck and Rubinfeld, 1981). This exercise used the single-equation regression models to explain a complex

structure of a health production. Production functions of dental caries were constructed. The production functions performed the process of converting inputs into outputs (Fearon, Ruch, and Wieters, 1989). Dental health status by the decayed-missing-and filled surfaces (dmfs) is the output of the process, which is influenced by many factors (see Chapter 2). Inference statistics were done by multiple regression to test the relationships between outputs, which are dependent variables, and inputs, which are independent variables. The surface numbers of Decay-Missing-Filled (dmfs) was used as a dependent variable. The independent variables were divided to three groups; first, child's factors; second, parent's socio-economic factors; and third, parent behavior factors.

The production function of dental health status is:

dmfs = f (input 1, input 2, input 3).

Substitute of input by the group of influencing factors, the function is:

dmfs = f (parent behavior, socio-economic status of child and parents, relevant others)

The input functions are:

Child's socio-economic status = h (age (x1), sex (x2), geographic area (x3), educational institution (x4), and related factors)

Parent's socio-economic status = j (age (x5), relationship to child (x6), education (x7), and related factors)

Parent behavior = g (knowledge (x8), attitude (x9), mass media (x10), health personnel (x11), volunteers (x12), received brush (x13), received fluoride (x14), and related factors)

The dmfs was the sum of decayed, missing, filled tooth surfaces which follow the criteria of WHO oral health survey method (WHO, 1989), including arrested caries.

Child age had a positive effect on child dental caries (Pornthip Phupatanakul et al., 1995).

Child sex Males had higher dmft than females (Chaiyut Siriviboonkiti et al., 1994).

Geographic area Thai children in rural provinces at age three had higher dmft than children from Bangkok and suburb provinces but no statistic test (DHD, 1994).

Educational institution: the educational status of child who studied or had day care experience and stayed at home. There was a dental health promotion

program in kindergarten school and preschool children center (KK.PHO, 1996). Therefore children in these institutions were expected to have good dental health.

Parent's age. Young parents induce an increase in between-meal eating (Dielman et al., 1982). Parent's age was expected to have a negative relationship with child dental caries.

Relationship to child was the parent status which are mother or others. The relationship between parent and child was associated with the practice of giving fluoride drops to children. The percentage of mothers who carry out this practice was higher than other parents (Sirikiat Reangkobkij et al., 1995). Mothers were expected to have a negative relationship with child dental caries.

Parent's education is the educational level of the parents. Children whose parents have low education level had high occurrences of caries (Chaiyut Siriviboonkiti et al., 1994). Parent's education was expected to have a negative relationship with child dental caries.

Knowledge was the knowledge score of parents about fluoride effects and utilization methods. Knowledge was a predisposing factor to parent behavior (Thasanee Mahawan, 1997). Knowledge score was expected to have a negative relationship with child dental caries.

Attitude was parental attitudes towards children's dental visits. Attitude was expected to have a negative relationship with caries status.

Mass media, health personnel, volunteers were sources of fluoride information received. Mass media included TV, radio, village radio, newspapers, and magazines. These sources of information were reinforcing factors on parent behavior (Thasanee Mahawan, 1997). Health personnel included face-to-face counseling, exhibitions, and campaign parades. Information received was expected to have a negative relationship with child dental caries.

Brushes and fluoride received were health service activities, which were expected to be enabling factors to parent behavior. These services were expected to have a negative relationship with child dental caries.

Substitute these variables into the equation and the reduced form equation is:

$$dmfs = f(x1, x2, x3, x4, x5, x6, x7, x8, x9, x10, x11, x12, x13, x14)$$

The model to be estimated:

$$dmfs = k + b1(x1) + b2(x2) + b3(x3) + b4(x4) + b5(x5) + b6(x6) + b7(x7) + b8(x8) + b9(x9) + b10(x10) + b11(x11) + b12(x12) + b13(x13) + b14(x14)$$

Table 4.1 Mean and standard deviation of variables in model function (N=309)

Variable	Definition	Value	Mean	S.D.
Dmfs	Decayed-missing-filled surfaces	0 through 65	13.214	12.735
x1	Child age (years)	3 through 6	4.243	1.252
x2	Child sex	1 = female, 0 = male	.508	.501
x3	Geographic area	1 = urban , 0 = rural	.188	.391
x4	Educational institution	1 = school or care center, 0 = home	.757	.429
x5	Parent's age (years)	18 through 75	37.104	12.590
x6	Relationship to child	1 = mother, 0 = others	.592	.492
x7	Parent's education	1 = more than primary school, 0 = up to primary school	.181	.386
x8	Knowledge score of oral care	0 through 4	1.948	1.643
x9	Attitude towards oral care	0 through 1	.146	.353
x10	Mass media	1 = received, 0 = not received	.191	.394
x11	Information from health personnel	1 = received, 0 = not received	.511	.501
x12	Information from volunteers	1 = received , 0 = not-received	.094	.292
x13	Received toothbrush free	1 = received, 0 = not-received	.210	.408
x14	Received fluoride supplement	1 = received, 0 = not-received	.434	.496
K	Constant			

From Table 4.1, mean dmfs was 13.214 surfaces, mean age of children was 4.234 years, mean of parents' age was 37.104, mean of knowledge score was 1.948. Other variables were dummy values.

4. Results of quantitative study

4.1. Descriptive results

4.1.1. Child's socio-economic status : child age, child sex, educational institution, and geographic area

The number of children three- and five- to six-year-old groups are 207 and 202 respectively after excluding missing values and total 309 cases to analyze in the estimated function model. Males make up 47.7 percent and females make up 52.3 percent (Table 4.2). The percentage of children three- and five- to six-year-old group who studied at schools or day care centers was 57.5 and 89.6 respectively (Table 4.3). The percentage of children three- and five- to six-year-old group who live in urban areas was 23.7 and 15.3 respectively (Table 4.4).

Table 4.2 Number and percentage of population sample distributed by age group and sex

Sex	Age: 3 years	Age: 5-6 years	Row total
Male	100 (48.3%)	95 (47.0%)	195 (47.7%)
Female	107 (51.7%)	107 (53.0%)	214 (52.3%)
Column total	207 (50.6%)	202 (49.2%)	409 (100%)

Table 4.3 Number and percentage of sample distributed by age group and educational institution

ational institution	Age: 3 years	Age: 5-6 years	Row total
Home	88 (42.5%)	21 (10.4%)	109 (26.7%)
Schools and care centers	119 (57.5%)	181 (89.6%)	300 (73.7%)
Column total	207 (50.6%)	202 (49.4%)	409 (100%)

Table 4.4 Number and percentage of sample distributed by age group and geographic area

Urban	Urban area	Rural area	Row column
Age group 3	49 (23.7%)	158 (76.3%)	207 (50.6%)
Age group 5-6	31 (15.3%)	171 (84.7%)	202 (49.4%)
Column total	80 (19.6%)	329 (80.4%)	409 (100%)

4.1.2. Parent's socio-economic status : age, relationship to child, and parent's education

Parents who take care of their children were mothers (61.9%), grand parents (21.8%), fathers (9.3%), and others (7%) (table 4.5). Parents' age ranged from 18 to 75 years old. The majority was between 25-34 years (table 4.6). Most of the parents (74%) finished primary school at fourth or sixth grade (table 4.7). Family occupations were farmers (54.5%), laborers (27.9%), merchants (7.8%), and civil servants or government enterprise officers (5.9%) (table 4.8).

Table 4.5 Number and percent of children distributed by parent's relationship to child

Relationship to child	Row total
Mother	253 (61.9%)
Father	38 (9.3%)
Grandparents	89 (21.8%)
Others	29 (7.0%)
Column total	409 (100%)

Table 4.6 Number and percent of children distributed by parent's age

Parent's age	Age: 3 years	Age: 5-6 years	Row total
18-24	27 (13.0%)	17 (8.4%)	44 (10.8%)
25-34	90 (43.5%)	122 (60.4%)	212 (51.8%)
35-44	34 (16.4%)	30 (14.9%)	64 (15.6%)
45-60	43 (20.8%)	21 (10.4%)	64 (15.6%)
61-75	13 (6.3%)	12 (5.9%)	25 (6.1%)
Column total	207	202	409 (100%)

Table 4.7 Number and percent of children distributed by parents' educational level

Parents' educational level	Row total
Lower than grade 4	24 (5.9%)
Grade 4-6	303 (74.0%)
Grade 9	30 (7.3%)
Grade 12 or diploma	46 (11.2%)
Bachelor's degree or higher	6 (1.5%)
Column Total	409 (100%)

Table 4.8 Number and percent of children distributed by family' s occupation

Family occupation	A g e : 3 years	Age: 5-6 years	Row total
Merchants	18	14	32 (7.8%)
Farmers	104	119	223 (54.5%)
Laborers	66	48	114 (27.9 %)
Civil servants, gov't enterprise	9	15	24 (5.9 %)
Others	10	6	16 (3.9 %)
Column Total	207	202	409 (100%)

4.1.3. Parent behavior

4.1.3.1. Child's oral cleansing habits

The percentage of children who had toothbrushes at the first tooth eruption was 9.1 percent (Table 4.9). At age 1½, 53.6 percent had toothbrushes. The percentage of children who received "My First Toothbrush" from staff was 24. At

age three, the percentage of parents who let their children brush themselves was 44.4 percent (Table 4.10). The percentage of parents still brushing for their child was 15.5. Thirty-three percent of children needed their parent's encouragement while 6.8 percent of children failed to brush. Sixteen percent of parents never had their children's teeth examined. At age five-six, the percentage of parents who let children brush their teeth themselves was 62.4 percent, while 8.6 percent of parents were brushing for their child at age five.

Table 4.9 Age of having toothbrush by source

Age at first toothbrush	Source	Row total
At tooth eruption age	self-acquired	26 (6.4%)
	received from officer	11 (2.7%)
At one and a half years old	self-acquired	136 (33.3%)
	received from officer	87 (21.3%)
Others		149 (36.4%)
Column Total		409 (100%)

Table 4.10 Oral cleansing habits of children by age group

Habit	Age: 3 years	Age: 5-6 years	Row Total
Self-brushing	92 (44.4%)	163 (80.7%)	255 (62.4%)
Encouraged by parents	69 (33.3%)	27 (13.4%)	96 (23.5%)
Parents do brushing for child	32 (15.5%)	3 (1.5 %)	35 (8.6%)
No brushing	14 (6.8%)	9 (4.5%)	23 (5.6%)
Column Total	207 (100%)	202 (100%)	409 (100%)

Table 4.11 Oral screening habits of parents by child age group

Oral screening habits	Age: 3 years	Age: 5-6 years	Row Total
Yes	171 (82.6%)	172 (85.1%)	343 (83.9%)
Never	36 (17.4%)	30 (14.9%)	66 (16.1%)
Column Total	207 (100%)	202 (100%)	409 (100%)

4.1.3.2. Fluoride supplement compliance

The percentage of sample children who have received fluoride supplements was 54 (Table 4.12). The percentage of children who have used fluoride tablets, fluoride drops or both were 34, 54, and 10 respectively (Table 4.13). The duration of fluoride consumption was between three months to five years (Table 4.14). Only ten percent of samples present take fluoride supplements (Table 4.12).

Table 4.12 Fluoride supplement received by age group

Condition	Age: 3 years	Age: 5 years	Row Total
Presently take fluoride	24 (11.5%)	17 (8.4%)	41 (10.0%)
Have in the past, but stopped	89 (42.9%)	93 (46.0%)	182 (44.4%)
Know of fluoride but have never taken	32 (15.4%)	37 (18.3%)	69 (16.8%)
Don't know about fluoride	58 (28.0%)	55 (27.2%)	114 (27.8%)
No response	4 (1.9%)	0	4 (1.0%)
Column Total	207 (100%)	202 (100%)	409 (100%)

Table 4.13 Type of fluoride supplement from those who have used fluoride (excludes missing data)

Type of fluoride	Age: 3 years	Age: 5 years	Row Total
Fluoride tablets	23 (35.9%)	18 (32.7%)	41 (34.4%)
Fluoride drops	36 (56.2%)	29 (52.7%)	65 (54.6%)
Tablets and drops	5 (7.8%)	8 (14.5%)	13 (10.9%)
Column total	64 (100%)	55 (100%)	119 (100%)

Table 4.14 Duration of fluoride consumption (in months) by age group

Age group \ Duration	3	6	12	24	36	48	60	No response	Total
3 years	1	0	4	3	7	0	0	9	24
5-6 years	0	1	3	2	1	3	2	5	17
Column total	1	1	7	5	8	3	2	14	41

4.1.4. Knowledge

The percentage of sample parents who know of fluoride is 71.9. From four questions, 16.6 percent of parents gave all correct answers and 51.6 percents gave all incorrect answers (Table 4.15). The majority of parents who know of fluoride received fluoride information from health personnel and their activities such as exhibitions and campaign parades. Seven percent of parents received fluoride information from volunteers and others received from mass media including radio, television, newspapers, magazines, and village radio (Table 4.16).

Table 4.15 Parent knowledge of fluoride by age group

Knowledge score	Age: 3 years	Age: 5 years	Row Total
4	36 (17.3%)	32 (15.8%)	68 (16.6%)
3	39 (18.8%)	53 (26.2%)	92 (22.5%)
2	12 (5.7%)	15 (7.4%)	27 (6.6%)
1	7 (3.3%)	4 (1.9%)	11 (2.7%)
0	113 (54.5%)	98 (48.5%)	211 (51.6%)
Column Total	207 (100%)	202 (100%)	409 (100%)

Table 4.16 Sources of information about fluoride

Source	Received	Not received	No response	Total
Radio, television	59 (14.4%)	251 (61.3%)	99	409
Newspapers, magazines	8 (2.0%)	302 (73.8%)	99	409
Officers, exhibition, parades	158 (38.6%)	152 (37.1%)	99	409
Volunteers	29 (7.1%)	281 (68.7%)	99	409
Village radio	5 (1.2%)	305 (74.5%)	99	409

4.1.5. Attitude

A majority of 83.9 percent of parents have examined their children's teeth (Table 4.17). Slightly more than half, or 53 percent, of parents perceived that their children had caries with either present or absent pain (Table 4.18); 42.2 percent of parents perceived that their children had no problems; 71.7 percent of the "no problem" group had caries after examination by a dentist (Table 4.19). Most parents thought that children should see a dentist when they have problems while 16 percent thought children should see a dentist regularly at least once a year (Table 4.20).

Table 4.17 Parental oral examination of their children

Child's oral examination	Percent of parents (N=409)
Practice	83.9
Never practice	16.1
Column total	100

Table 4.18 Perceived dental problems of parents by children's age group

Problems	Age: 3 years	Age: 5-6 years	Row Total
No problems	112 (54.1%)	61 (30.1%)	173 (42.3%)
Caries, no present pain	59 (28.5%)	90 (22.0%)	149 (36.4%)
Caries, present pain	25 (12.0%)	43 (21.2%)	68 (16.6%)
Others	5 (2.4%)	4 (1.9%)	9 (2.2%)
No response	6 (2.8%)	4 (1.9%)	10 (2.4%)
Column total	207 (100%)	202 (100%)	409 (100%)

Table 4.19 Numbers of surfaces of decayed-missing-filled in the parent's perceived "no problem".

Dmfs	Age: 3 years	Age: 5 years	Row Total	Cum. Percent
0	36 (32.1%)	13 (21.3%)	49 (28.3%)	28.3
1-5	30 (26.7%)	13 (21.3%)	43 (24.9%)	53.2
6-10	25 (22.3%)	15 (24.5%)	40 (23.1%)	76.3
11-38	21 (18.7%)	19 (31.1%)	40 (23.1%)	99.4
65	0	1 (6.1%)	1 (0.6%)	100
Column total	112	61	173	100

Table 4.20 Parental opinions when children should see a dentist

Condition	Age: 3	Age: 5	Row Total
Regularly, at least once a year	32 (15.4%)	34 (16.8%)	66 (16.1%)
When problems arise	142 (68.5%)	154 (76.2%)	296 (72.4%)
Unnecessary, as permanent teeth will erupt to replace primary teeth	3 (1.4%)	4 (1.9%)	7 (1.7%)
Others	25 (12.0%)	6 (2.9%)	31 (7.6 %)
No response	5 (2.4%)	4 (1.9%)	9 (2.2%)
Column total	207 (100%)	202 (100%)	409 (100%)

4.1.6. Dental health service activity

The percentage of sample parents who have received information about fluoride from health personnel was 38.6 (Table 4.16). The percentage of sample parents who have received information about fluoride from volunteers was 7.1 (Table 4.16). The percentage of sample children who have received fluoride and toothbrushes was 54.5 and 24.0 (Table 4.12 and 4.9).

4.2. Analysis results

4.2.1. Empirical results

Estimation of the decayed-missing-filled surfaces (dmfs) by multi-variables included three sets.

- The function set 1 is:

  dmfs = h (Child's socio-economic status)

  = h (child age, sex, geographic area, educational institution)

- The function set 2 is:

  dmf = j (Parent's socio-economic status)

  = j (parent's age, relationship to child, education)

- The function set 3 is:

  dmfs = g (Parent behavior)

  = g (knowledge, attitude, mass media, health personnel, volunteers, receiving toothbrush, receiving fluoride)

- Finally, the final model is:

  dmfs = k (child sex, child age, parent's age, relationship to child, parent's education, knowledge, attitude, mass media, health personnel, volunteers, received toothbrush, received fluoride)

Child age

- Older children are expected to have more dmfs. An expected sign was positive. Child age had a positive effect on child dental caries (Pornthip Phupatanakul et al., 1995).
- Empirical results showed positive sign and statistical significant difference at .01 significant level (Table 4.21).

Child sex

- Studies reported male children had higher occurrence of caries than females (Chaiyut Siriviboonkiti et al., 1994; Pornthip Phupatanakul et al., 1995). The expected sign of child sex variable was negative (Female = 1, Male = 0).
- The empirical results showed negative sign and statistical significant difference at .05 significant level (Table 4.21).

Geographic area

- The national oral survey reported rural children had higher occurrences of caries than urban children but no statistical significant difference showed (DHD, 1994). The expected sign of geographic area may be negative or positive.
- The empirical results showed negative sign but insignificant (t=.066) (Table 4.21).

Educational institution

- The children in school or day care centers may brush after lunch under the supervision of caretakers or teachers, which is included in the preschool children dental health promotion program (KK.PHO., 1996). The expected signs are negative.
- Empirical results showed negative signs but is insignificant (Table 4.21)

Table 4.21 Linear multiple regression analyses with dmfs as dependent variable in function set 1(N =409)

Variables	B	T value	p value
x1 (age)	2.758	5.099	.000 * *
x2 (child sex)	-3.725	-2.992	.003 * *
x3 (geographic area)	-.107	-.066	.948
x4 (educational institution)	-1.990	-1.282	.201
Constant	4.959	2.141	.0329

Multiple R = .283, R Square = .080, F = 8.793, Signif F = .0000, * * = p< .01

Table 4.22 Linear multiple regression analyses with dmfs as dependent variable in function set 2 (N=409)

Variable	B	T	P value
x5 (Parent's age)	-.218	-3.092	.002 * *
x6 (relationship to child)	-3.363	-1.980	.048 *
x7 (parent's education)	-4.411	-2.648	.008 * *
Constant	23.901	6.875	.000 * *

Multiple R =.175, R Square = .031, F= 4.281, Signif F = .0054, *=p<.05, **=p<.01

Table 4.23 Linear multiple regression analyses with dmfs as dependent variable in function set 3 (N = 409)

Variable	B	T	P value
x8 (knowledge)	.173	.224	.823
x9 (attitude)	-.626	-.287	.774
x10 (mass media)	1.712	.733	.464
x11 (information from health personnel)	.380	.147	.884
x12 (information from volunteers)	-5.429	-2.030	.043 *
x13 (toothbrush free)	1.817	.975	.330
x14 (fluoride supplement)	-1.116	-.492	.623
(constant)	13.057	11.025	.0000 **

Multiple R = .133, R Square = .018, F= 0.770, Signif F = .6131, *= p<.05, **= p<.01

Parent's age

- The younger parents influenced an increase in between-meal consumption (see Chapter 2). The expected sign was negative.
- Empirical results showed negative signs and statistically significant at .05 significant level (Table 4.22).

Relationship to child

- Mothers were expected to take better care of children than others. The expected sign was negative.
- Empirical results showed negative sign and statistically significant at .05 significant level (Table 4.22).

Parent's education

- Children whose parents finished high levels of education had low occurrences of dental caries (see Chapter 2). The expected sign was negative.
- Empirical results showed negative signs and statistical significant at .01 significant level (Table 4.22).

Knowledge

- Knowledge was predisposing factors for parent behavior (Thasanee Mahawan, 1997). Positive parent behavior for oral childcare reduced caries risk. The expected signs of knowledge variable were negative.
- Empirical results showed positive signs but were insignificant (Table 4.23).

Attitude

- Parental attitudes toward child dental visits were expected to be negative.
- Empirical results showed a negative sign but were insignificant (Table 4.23).

Source of information

- The sources of information were reinforcing factors for parent behavior (Thasanee Mahawan, 1997). All these variables were expected to have negative signs.
- Empirical results showed positive signs but insignificant on mass media and health personnel and showed negative signs with statistical significant at 0.5 significant level for volunteers (Table 4.23).

Distribution of free toothbrushes

- Free toothbrushes were estimated to be an enabling factor to parent behavior. The expected sign was negative.
- Empirical results showed a positive sign but were insignificant (Table 4.23).

Distribution of fluoride supplement

- Fluoride supplements were estimated to be an enabling factor to parent behavior. The expected sign was negative.
- Empirical results showed a negative sign but were insignificant (Table 4.23).

The final model included associate factors to become the policy set. Children's socio-economic factors were age and sex. Parent's socio-economic factors were age, education, and relationship to child. Parent behavior set were information received from volunteers. Knowledge, attitudes, received fluoride, and other sources of information were also included even though these variables were insignificant in this study.

The final model is:

dmfs = f (x1, x2, x5, x6, x7, x8, x9, x10, x11, x12, x14)

The model to be estimated:

dmfs = k + b1(x1) + b2(x2) +b5(x5) + b6(x6) + b7(x7) + b8(x8) + b9(x9) + b10(x10) + b11(x11) + b12(x12)+ b14(x14)

Table 4.24 Linear multiple regression analyses with dmfs as dependent variable in final model (N=309)

Variables	B	T	P-value
x1 (age)	2.704	4.881	.000 **
x2 (child sex)	-4.067	-2.917	.004 **
x5 (parent's age)	-.160	-2.111	.0356 *
x6 (relationship to child)	-2.790	-1.458	.146
x7 (parent's education)	-5.102	-2.620	.009 **
x8 (knowledge)	-.075	-.101	.920
x9 (attitude)	-.351	-.170	.865
x10 (mass media)	2.427	1.070	.286
x11 (information from health personnel)	.904	.361	.718
x12 (information from volunteers)	-5.033	-2.002	.046 *
x14 (fluoride supplement)	-.645	-.302	.763
(constant)	12.345	2.632	.0089

Multiple R = .370 R Square = .137 F= 4.280 Signif F = .0000 (* = P<.05, ** = P<.01)

4.2.2. Policy simulation

Simulation is a method to make scenario on an assumption and estimate an outcome of that scenario. This simulation estimated the dental caries status due to completed implementation of an effective intervention.

Health volunteers are the intermediaries between the government sector and people in the community. In Kokephochai Sub-district, health officers trained health volunteers to distribute fluoride supplements and disseminate information about oral health to the people in the community. Children whose parents received information from health volunteers had fewer occurrences of caries than others. The recommended policy is oral health promotion by volunteers to approach all parents since this exercise selected the final model as an estimator for children dental caries. Under the assumption that means of all independent variables are constant except volunteer variable and all parents received dental health information from volunteers.

To predict the number of surface decayed-missing-filled, the procedure put the means of all independents which is represented by x_i , when i = 1-14, in equation, then simulating the mean of policy variables by giving the mean of value of received information from volunteers equal to 1, the dmfs will be 8.65.

Previous situation 13.21 = {k+b1(x1)+b2(x2)+b5(x5)+b6(x6)+b7(x7)+b8(x8)
+b9(x9)+b10(x10)+b11(x11)-5.033(.094)+b14
(x14)+ e}

Simulation scenario 8.65 = {k+b1(x1)+b2(x2)+b5(x5)+b6(x6)+b7(x7)+b8 (x8)+b9(x9)+b10(x10)+b11(x11)-5.033(1)+b14 (x14)+ e}

The percent of caries reduction is equal to:

100 * (8.65 - 13.21) / 13.21 = - 34.52

Qualitative part

The data from quantitative data collecting were incomplete. There was some information absent such as child's dietary habit and process of service approach. This qualitative data collecting was full-fill the absent and also explained phenomena with reasoning.

1. Objective of qualitative study

1.1. To explain parent's behavior about childcare which effect to child dental health.

1.2. To explain dental services approach process .

1.3. To explain the supporting factors and obstructing factor in continuing child oral care.

2. Research question of qualitative study

2.1. What is the dietary habit of children?

- How long the child had breast-feeding ?
- When did milk-bottle-fed commence?
- Do the child slept with milk bottle? and why?

- How old was the child when milk-cup-drink commence?
- How many times per day the child takes sweet, sugar contained beverage?

2.2. How do oral cleansing and fluoride supplement of children?

- When did the child 's oral cleansing commence? How? Why?
- What age of the child that the parent brush the child's teeth? Why?
- How did the parent get the first toothbrush? From Whom? and did they suggest anything?
- Do the parent use toothpaste for the child? Do she/he know about fluoride containing toothpaste?
- How many times per day does the child brushing? Do the parent help or encourage him for brushing?

2.3. Do the parent and child received any health services relevant to oral health?

- Do the parent ever received knowledge about breast feeding, tooth-brushing, fluoride supplement? from whom? and How?
- Do the child ever received fluoride supplement? From where? How much money the parents have to spend? Did

the child take fluoride? How do the parent do when fluoride ran out?

- Does the child ever has oral examination? Why? Does the parent think it is necessary to have oral check up or not?
- Do the parents ever examine the child 's oral and teeth?
- What is the health officer activities about oral health in the village?
- What are the volunteer's activities about oral health in the village?
- What are reinforcing factors for health volunteer working?

3. Materials and Methods of qualitative study

3.1. Qualitative data collection

The qualitative study was conducted on March 24-25, 1997. Parents of 20 children, who were subjects in quantitative data collection, were interviewed to describe dietary habits, child oral cleansing habits, and service activities. Health volunteers of two villages were interviewed to describe service activities and predisposing factors to conduct those activities. Health officers of two sub-districts were interviewed to describe the process of dental health service activities and the costs of such programs. District Health Officers were interviewed about their opinions of the activities and how to develop them. Interviewing based on open-end question guideline. Data recorded by paper field note and tape cassette recorder.

3.2. Sample selection

The qualitative intensive sampling was conducted. Two villages of two districts were purposely selected to do the qualitative study with the criteria of volunteer activities. The villages were Ban Kampom, Kampom Sub-district, Prayoen District, and Ban Koke, Kokephochai Sub-district, Kokephochai District. Cases were selected on the subject which were collected in quantitative data.

4. Results of qualitative study

4.1. Dietary habits

Data from qualitative collection showed the duration of breast-feeding is between one and eighteen months. Most children cared for by mothers were breast-fed longer, from four months. The reason for short duration of breast-feeding was that the mother went to work in another province. Bottled milk was substituted and most parents let the babies suck their bottles until they fell asleep. One parent said that after finishing, the baby would pull out the bottle himself. A grandmother said "I don't know whether he pulls out the bottle or not because I also fall asleep". Children were allowed to buy snacks and sweets. The amount that children spent per day was 2-10 Baht. Some parents said they allowed their children to buy snacks except for toffee. Children who like sweets have many teeth affected by dental caries.

4.2. Oral cleansing and consumption of fluoride supplements

In low caries cases, parents assisted children in brushing. Some children didn't brush. The reasons were "he doesn't want to brush" or "he is spoiled". Some children liked to swallow the toothpaste.

Fluoride drops were given to children from age six months at pediatric clinics at health centers and hospitals. At Kokephochai district, children received fluoride supplements when they were weighed and measured every three months.

Children who consumed fluoride over a long period received fluoride from the 6th Regional Mother and Child Hospital. One reason for ceasing the consumption of fluoride was "the fluoride was used up and didn't receive any more".

4.3. Parent attitudes

A parent said that if the child doesn't have pain, she does not bring the child to see a dentist. A parent said that since primary teeth will fall out, it is unnecessary to treat them. Many parents think toffees are the cause of dental caries but not carbohydrate snacks. A parent said that dental caries would not occur if water was drunk after eating sweets. Many parents believe that fluoride can protect teeth from caries.

4.4 Dental health services

The antenatal care (ANC) clinics provide oral examinations and dental health instruction to pregnant women. A parent said she was suggested to see a dentist for dental caries treatment and removing calculus when she went to ANC clinic. After

delivery, hospital nurses suggest breast-feeding. When the parents bring her children to receive immunization, they will receive fluoride drops and are told of the benefit and method of consumption.

Table 4.25 Case report of qualitative interview of parent case 1.

Date: March 24, 1997
Place: Moo 8, Sub-district Bankoke, Kokephochai District (3 kilometers from health center)
Note: There is a dental nurse at the Kokephochai Health Center. There are six snack vendors.

รายที่ 1 เด็กหญิง อายุ 6 ปีมีฟันผุระยะเริ่มแรก 7 ด้าน มีพี่น้อง 2 คน มีน้องชายอายุ 21/2 ปี ไม่มีฟันผุ พ่ออายุ 32 ปี รับราชการตำรวจ แม่อายุ 28 อยู่บ้านขายของชำและขนมเล็กๆ น้อย จบการศึกษามัธยมปลาย การเลี้ยงดู "เลี้ยงลูกเองทั้งวัน" **การกินอาหาร** "คนโตกินนมแม่ จนถึงอายุ 1ปี 6 เดือน หลังจากนั้นกินนมผงถึงอายุ 3 ขวบ แล้วเลิกกินนม คนเล็กกินนมแม่ 4 เดือน จากนั้นเลิกกินเอง ไม่ชอบกินนมแม่" "คนโตกินนมเสร็จนอนเลย กินน้ำตามเป็นบางวัน คนเล็กกินนมเสร็จแล้วหลับไปเลย เดี๋ยวนี้ยังกินนมหลับคาขวดนมอยู่ เวลานอนต้องดูดขวดตลอด ถ้าไม่ได้ดูดจะร้องไห้ เคยหัดให้กินนมใส่แก้วแต่ไม่ยอมกิน" "เด็กทั้งสองคนชอบกินขนมหวาน คนโตชอบขนมถุง กินวันละ 2 ถุง คนเล็กชอบกินลูกอม อมวันละประมาณ 2 เม็ด อมหลังกินข้าวตอนวิ่งเล่น" "แม่ไม่ให้ไปซื้อเอง แม่จะซื้อมาให้ คนโตให้เงินไปโรงเรียนวันละ 3 บาท" "เด็กกินน้ำอัดลมอาทิตย์ละ 1-2 ขวด" **การทำความสะอาดช่องปากและกินฟลูออไรด์** "คนโตแม่ช่วยเช็ดฟัน เช็ดปาก ตอนที่ฟันยังไม่ขึ้น ปีครึ่งมีฟันขึ้นแม่แปรงฟันให้และช่วยลูกแปรงจนถึงอายุ 4 ขวบ ขณะนี้เด็กแปรงเองแปรงเช้า กับเย็นหลังกินข้าว" "คนโตเข้าอนุบาลตอนอายุ 5 ขวบ ไม่เอาแปรงไปโรงเรียน เด็กบอกว่าครูไม่ให้เอาแปรงไป" "คนเล็กเริ่มทำความสะอาดปาก ตอน 4-5 เดือน ตอนแรกไม่ค่อยได้ทำความสะอาดให้ ถ้ามีโอกาสจะเช็ดให้ตั้งแต่ฟันขึ้นตอน 11 เดือน จนถึง 2 ขวบไม่ยอมให้แปรงฟันให้"	Case 1 A 28-year-old mother with two children; one daughter and one son. The daughter was six years old. She had seven early caries surfaces. The son was 2½ years old. The father was a police officer, age 32. The mother had a small shop at home. The mother finished high school. The mother took care of children all day. Dietary habits "The girl was breast fed until 1½ years and drank from a bottle until three years old." "The son stopped breast feeding at four months. He didn't like mother's milk." "The daughter had milk before going to bed and some days followed by water." "The son still slept with a milk bottle and sucked all the time. He will cry if he isn't allowed to suck." "He tried drinking from a glass but didn't continue." "Both children like sweets. The girl likes snacks. She ate two packs a day. The boy likes toffee. He ate two pieces a day after breakfast and at play time." "The mother doesn't allow them to buy sweets themselves. She provides sweets for them. The children drink one to two bottles of carbonated beverages per week." Oral cleansing and fluoride supplements "The mother cleaned oral tissue for children before tooth eruption to 1½ years. She helped the daughter brush until age four years, then the daughter brushed herself in the morning and after dinner. The boy started oral cleansing at age four-5 months. At the beginning didn't clean. He didn't allow brushing from tooth eruption at age 11 months until two years old."

Table 4.25 (continued) Case report of qualitative interview of parent case 1.

"ใช้ยาสีฟันยี่ห้อโคโดโม ดูว่ามีฟลูออไรด์ด้วย" "คนเล็กชอบกินยาสีฟัน" "คนโตคอนเล็ก ๆ ได้หยอดฟลูออไรด์ให้เรื่อยๆ ถ้าหมดก็ไปขอที่อสม.ได้ เป็นน้ำใช้ได้ถึงอายุ 2 ปี จากนั้นให้เป็นเม็ดให้กินหลังกินข้าวเช้า ไม่เคี้ยวให้กลืนเลย หยุดกิน 3-4 เดือนแล้ว หมดเลยไม่ได้ไปเอาอีก" <u>การบริการ</u> " เคยมีอสม.ช่วยสอนแปรงฟันให้ปัดขึ้นลงและคนโตเคยได้รับแจกแปรงเด็กจากอสม.คนเล็กไม่ได้รับแม่ซื้อแปรงให้เอง" "อสม.แนะนำให้หยอดฟลูออไรด์" "ตอนคลอดลูกแล้วพยาบาลที่โรงพยาบาลแนะนำการให้ลูกกินนมแม่" "ตอนไปฝากครรภ์ที่โรงพยาบาลศูนย์ หมอตรวจเจอว่าฟันผุเลยไปอุดฟันและขูดหินปูนที่สถานีอนามัย เจ้าหน้าที่ก็แนะนำวิธีแปรงฟันด้วย" "ไม่เคยพาลูกไปตรวจฟันเพราะว่าฟันยังไม่ผุ คิดว่าจะพาลูกไปตอนอายุ 7 ขวบ" "ครั้งสุดท้ายไปหาอสม.ตอนชั่งน้ำหนักที่จุดนัดพบ 3 เดือนที่แล้ว พบเจ้าหน้าที่ที่บ้านอสม.ด้วย" <u>ทัศนคติ</u> "คิดว่าลูกกินลูกอมแล้วดื่มน้ำตาม ฟันจึงไม่ผุ" "เชื่อว่าฟลูออไรด์มีส่วนและกินลูกอมดื่มน้ำตามทำให้คนเล็กฟันจึงไม่ผุ" "สอนคนโตว่าเขากินลูกอมแล้วฟันไม่สวย ฟันผุเด็กจะเชื่อ" "ที่ร้านเคยขายขนม แต่ลูกกินก็เลยไม่เอาขนมมาขาย กลัวลูกฟันผุ" "อาจเป็นเพราะลูกผู้ชายเอาแต่ใจตัวเอง ไม่ยอมแปรงฟัน แม่ช่วยแปรงก็ไม่ยอม" "คนโตได้แปรงฟรีจากอสม.อาจจะมีส่วนทำให้เด็กอยากแปรงฟัน"	"The boy likes to swallow toothpaste. The girl has taken fluoride drops. If fluoride runs out, we are able to request it from a health volunteer. Drops were used until 2 years old and then changed to tablets. Stopped 3-four months ago because fluoride ran out and didn't go to request more" <u>Health services</u> "Health volunteers had come to teach up and down brushing strokes. The girl received a toothbrush from a health volunteer but the son didn't. The mother bought one for him. Health volunteers suggested using fluoride drops." "After delivery, hospital nurses suggested breast feeding at ANC Clinic of the provincial hospital. I received an oral examination and discovered that I had caries. I had my teeth cleaned and cavities filled at the health center. Staff also suggested brushing methods. Children have never had oral examinations because they don't have dental caries. I think children should visit the dentist at age seven." "The last time I met health volunteers and health staff was three months ago at a volunteer's house to weigh and measure children." <u>Attitudes</u> "If children drink water after eating toffee, they won't get caries." "I believe that fluoride and cleaning protect the teeth from caries." "Taking fluoride and drinking water after eating toffee protects my son from caries." "Because I thought that eating toffee would cause ugly teeth and caries, my child believed." "This shop sold sweets. Because my children ate candy, I feared that they would get caries." "My is spoiled so he didn't brush and wouldn't let me help him brush." "My daughter received a free toothbrush from volunteers. This may encourage her to brush.

Table 4.26 Case report of qualitative interview of parent case 2.

Date: March 24, 1997
Place: Moo 8, Bankoke Sub-district, Kokephochai District (3 km from the health center)
Note: There is a dental nurse at the Kokephochai Health Center. There are six snack vendors.

รายที่ 2 เด็กชายอายุ 3 ปีไม่มีฟันผุเลย เป็นลูกคนสุดท้องมีพี่ชาย 2 คน อายุ 15 และ 10 ปี แม่อายุ 34 ปี อาชีพทำนา พ่ออายุ 39 ปี อาชีพทำนาและรับจ้าง มีนา 15 ไร่ ได้ข้าว 200 ถังต่อปี การเลี้ยงดู "แม่เลี้ยงเอง" <u>การกินอาหาร</u> "กินนมแม่ตั้งแต่แรกเกิดถึง 3 เดือน จากนั้นกินนมผงจนถึง 3 ขวบ" "ตอนกลางคืนดูดนมขวดคาปากจนหลับ ตอนกลางวันแม่เอาออกให้" "ไม่ได้หัดดื่มนมจากแก้ว" "กินขนมวันละ 10 บาท นาน ๆ จะได้กินน้ำอัดลม ให้กินทอฟฟี่วันละ 1 บาท" <u>การทำความสะอาดและการกินฟลูออไรด์</u> "เช็ดปากให้ลูกตั้งแต่เล็ก เริ่มแปรงเมื่ออายุ 1 ขวบ ถ้าไม่ได้แปรงแม่ก็เช็ดให้" "แปรงฟันตามพ่อแม่ทุกวัน วันละ 2 ครั้ง เช้าและก่อนนอน" "ได้กินน้ำยาฟลูออไรด์ตอนอายุ 2 ขวบจากอสม.พอเปลี่ยนเป็นเม็ดเด็กไม่ยอมกิน หยุดกินมา 3 เดือนแล้ว" "ใช้ยาสีฟันคอลเกต มีฟลูออไรด์ผสม" <u>การบริการ</u> "ไม่เคยมีใครแนะนำเรื่องการกินนมแม่หรือการแปรงฟัน อ่านข้างกล่องเอา" "อสม.เคยแนะนำการกินฟลูออไรด์ ป้องกันฟันผุ" "ถ้าไม่ปวดจะไม่ไปพบหมอฟัน แต่เคยพอไปตรวจ"	Case 2 A 34-year-old mother was a farmer and had three children. The last child was a three-year-old son who was caries-free. The elders were 15 and ten years old. The father, 39, was a farmer and laborer. This family had farm 15* 1600 m^2. They earned 200 cases of rice per year. The mother took care of this son. <u>Dietary behavior</u> "The son was breast fed for the first three months and drank from a bottle until age three." "At night he drank milk from a bottle until falling asleep. In the morning, the mother removed it." "The son never practiced drinking from a glass." "The son bought ten Baht worth of snacks per day. He seldom drank carbonated drinks but was allowed to eat one Baht of toffee per day." <u>Oral cleansing and fluoride supplement</u> "The baby's oral tissue was cleaned since birth. Brushing began at age one." "If the son didn't brush, the mother would clean his mouth for him." "He brushed following his father and mother every day two times a day: in the morning and before bedtime." "Received fluoride drops at age two from volunteers." "Later, tablets were substituted for drops. The son didn't like to take the tablets and stopped taking fluoride at three months of age." "Used fluoride toothpaste." "Nobody suggested breast feeding or brushing; read information from toothbrush case." "Health volunteers suggested fluoride supplements to prevent caries.

Table 4.26 (Continued) Case report of qualitative interview of parent case 2.

ทัศนคติ "แม่ไม่อยากให้กินทอฟฟี่ เพราะกลัวฟันผุ" "มีลูก 3 คนไม่มีใครเคยฟันผุ ปัจจุบันมีขนมหวานมากกว่าก่อน" "ใช้ยาสีฟันมีฟลูออไรด์ อาจจะมีส่วนช่วยให้ฟันไม่ผุ"	"If the son had no pain, it was not necessary to see a dentist. However, he had received an oral examination." Attitude "The mother doesn't want her children to eat toffee because she fears that children will get caries." "There are more sweets now than before." "Fluoride toothpaste may prevent dental caries."

Table 4.27 Case report of qualitative interview of parent case 3

Date : March 24, 1997 Place : Moo 8 Sub-district Bankoke Kokephochai District (3 kilometers far from health center) Note : Having a dental nurse working at Kokephochai Health Center, Having six snack vendors.	
รายที่ 3 เด็กชายอายุ 6 ปี อยู่โรงเรียนอนุบาลชุมชนบ้านโคก มีฟันผุ 11 ด้านเป็นโพรงใหญ่และตอฟัน แม่อายุ 32 ปี จบการศึกษา ป.6 อาชีพ ทำนา พ่ออายุ 37 ปี จบการศึกษา ป.6 อาชีพ รับจ้าง รายได้ประมาณ 6,000 บาทต่อเดือน ทำนาได้ข้าว 100 ถังต่อปี มีพี่น้อง 2 คน พี่สาวอายุ 9 ปี การเลี้ยงดู "ให้ยายเลี้ยง เพราะแม่ไปทำงานบริษัทอะไหล่โทรศัพท์ที่จังหวัดปทุมธานี" ขณะนี้แม่กลับมาแล้ว การกินอาหาร "กินนมแม่ถึงอายุ 1 เดือนเพราะแม่ไปทำงานต่างจังหวัดกับพ่อ" "กินนมขวดตั้งแต่ 2 เดือนถึง 2 ปี" "ดูดนมหลับคาปากเพราะยายก็หลับ กินหมดแล้วเด็กเอาออกเอง" "ไม่ได้ให้ดื่มนมจากแก้ว มีแต่ดื่มนมถุงแจกตอนเข้าเรียน" "ลูกชอบกินลูกอม ให้เงินวันละ 5 บาท ซื้อขนมถุงกับลูกอม" "ที่โรงเรียนไม่มีลูกอมขาย"	Case 3 A 32-year-old mother finished grade six. She is a farmer. She has two children; a six-year-old son and a nine-year-old daughter. The son studied at Bankoke community kindergarten. He had 11 caries surfaces including big cavities and root retained. The father was 37 year old. He finished grade six and earned 6,000 Baht/month from manual labor. This family raises 100 cases of rice per year. Child-care: cared for by grandmother because mother went to work with a telephone components company in Pathumthanee Province. The mother returned and lives at home now. Dietary feeding "The son was breast-fed until one month old because the mother went to work at another province with the father." "Bottle feeding from the second month until two years old." "He sucked the bottle until falling asleep because the grandmother also fell asleep." "He didn't practice drinking from a glass." "He likes toffee." "Gives him 5 baht/day." "No toffee for sale at school."

Table 4.27 (continued) Case report of qualitative interview of parent, case 3

<u>การทำความสะอาดและการกินฟลูออไรด์</u> "ยายไม่เคยเช็ดปากและฟันให้หลาน ให้เริ่มแปรงฟันเองตอนอายุปีกว่า ๆ แปรงตอนเช้าครั้งเดียว ต้องเรียกให้แปรงถึงจะแปรงแต่ตอนเย็นไม่ยอมแปรง" "เวลามีเศษอาหารติดฟันแม่จะใช้ไม้แคะออกให้" <u>การบริการ</u> "ได้รับแจกฟลูออไรด์ตอนเด็กอายุ 3 ปี อสม.เอามาแจกให้ที่บ้านหมดแล้วไม่ได้ไปเอาอีก" "อสม.เคยมาแนะนำวิธีแปรงฟันและแจกฟลูออไรด์" "ลูกเคยปวดเลยพาไปหาหมอที่โรงพยาบาลแต่เด็กไม่ยอมถอน กลัวหมอเลยขอยามากิน" "เคยดูฟันให้ลูกเพราะมีฟันผุ" "ฟันเหลือแต่ดอ" <u>ทัศนคติ</u> "คิดว่าฟันน้ำนมเดี๋ยวมันก็หลุดเอง ไม่ต้องทำอะไร"	<u>Oral cleansing and fluoride supplement</u> . "Grandmother never cleaned the oral tissues and teeth of the child." "The boy was allowed to brush his own teeth from the age of one." "Have to encourage brushing." <u>Service</u> "Received fluoride when child was age three from volunteers. After fluoride ran out, I didn't go to receive more." "Health volunteers recommended brushing methods and delivered fluoride." "The son saw a dentist at the hospital because of dental pain, but the tooth was not extracted because the son was afraid. He received medicine." "The mother checked the child's teeth because he had cavities." <u>Attitude</u> "The primary teeth will fall out, so it's not necessary to treat them."

Table 4.28 Case report of health volunteer interview

Date : March 24, 1997 Place : Moo 8 Sub-district Bankoke Kokephochai District Note : Group interview with health volunteers	
หญิงคนที่ 1 อายุ 24 ปีเป็น อสม.มา 5 ปีแล้ว หญิงคนที่ 2 อายุ 40 ปีเป็น อสม.มา 5 ปีแล้ว ชายคนที่ 1 อายุ 39 ปี เป็นอสม.มา 4 ปีแล้ว "ผู้ใหญ่บ้านเรียกไปคุย ชวนให้เป็น อสม." "ผู้ใหญ่บ้านบอกว่าคนที่จะเป็น อสม.ต้องเสียสละ ต้องทำงาน ต้องรับผิดชอบ ต้องทำงานร่วมกัน" "อยากลองเป็นอสม.แล้วเป็นมาเรื่อย ๆ ทำงานร่วมกันได้ดี เคยได้รางวัล ศสมช.ดีเด่น" "มีอสม.ในหมู่บ้านเดียว 15 คน" "เคยได้รับการอบรมด้านทันตสุขภาพปีที่แล้ว อบรมที่สอ.1 วัน เรื่อง วิธีแปรงฟัน วิธีใช้ฟลูออไรด์ วิธีกินอาหาร และให้ไปแนะนำชาวบ้านต่อ" "ปกติมาประชุมเดือนละครั้ง ไม่รบกวนเวลาเพราะต้องมาไปไร่ข้าวโพดหรือไปนาไปวันหลังได้"	Three health volunteers of Moo 8 village were interviewed. The first woman, age 24, had worked as a health volunteer for five years. The second woman, age 40, had also worked as a health volunteer for five years. "The head of the village motivated me to be a health volunteer." "The head of the village said health volunteers should devote themselves, must work, must take responsibility, and must cooperate in the group." "I applied and continued working as a health volunteer. We received an award as the best primary community health care center." "We have 15 volunteers in our village." "Last year we were trained one day about dental health, tooth brushing techniques, and dietary fluoride use. Our job was to instruct villagers." "Normally we have meeting once a week. It wasn't a waste of time because we have to come. Farm work can be postponed to other days."

Table 4.28 (continued) Case report of health volunteer interview

"วันที่ 20 มี.ค. เป็นวันอสม. มีการรณรงค์ทุกเรื่อง สถานีอนามัยเขียนป้ายผ้าให้มาถือเดินขบวน มีเรื่องโรคฟันผุ และถือแปรงสีฟันเชิญชวนแปรงฟันด้วย" "ช่วยจ่ายฟลูออไรด์ เฉพาะช่วงชั่งน้ำหนัก และเปิดบริการที่ศสมช.ตอนเช้าครึ่งชั่วโมงและตอนเย็นชั่วโมงครึ่งให้บริการขายยาและล้างแผล มีเวรประจำ รายได้เข้ากองทุนยา อสม.มีหุ้น มีปันผล" "ผู้ใหญ่ไม่ค่อยพาเด็กมารับฟลูออไรด์" "ไม่ค่อยได้ตรวจดูฟันเด็ก" "เมื่อก่อนมีแปรงมาแจกเด็ก เดี๋ยวนี้หมด เห็นว่าเจ้าหน้าที่จะเอามาให้เพิ่ม" "คิดว่าผลงานดี เกิดจากความสามัคคีของอสม.การปฏิบัติงานดี และเจ้าหน้าที่มาเยี่ยมบ่อย"	"Health volunteer day was March 20." "We had a campaign parade. Health personnel prepared equipment for us. All health issues and dental caries were included. We also promoted brushing." "We helped health personnel by giving fluoride to babies during weighing." "We open the primary community health care center for service half an hour in the morning and an hour and a half in the evening. Types of services include distribution of medicine, injury cleansing. We divide responsibility for routine tasks. The revenue is contributed to the Drug Fund in which health volunteers participate." "Parents seldom received fluoride for their children." "We seldom examine children's teeth." "Health personnel brought toothbrushes for distribution to children. Toothbrushes ran out of stock. They will be restocked." "The good outcome result from unity of health volunteers, hard work, and frequency of health personnel visits.

Table 4.29 Case report of health officer interview

Date: March 24, 1997 Place: Kokephochai Health Center Note: This health center is next to the district health office. This health officer is a dental nurse and has worked at this health center for three years after finishing dental nurse school.	
ชายอายุ 23 ปี ตำแหน่งเจ้าพนักงานทันตสาธารณสุข "กิจกรรมทันตสุขภาพสำหรับเด็กเล็ก 0-5 ปี มีการประชุมอสม.ให้ช่วยไปเผยแพร่เรื่องการแปรงฟัน ประโยชน์ของฟลูออไรด์ อาหารที่มีประโยชน์ต่อฟันของเด็กรวมถึงโภชนาการและขนม" "ช่วงที่มีการชั่งน้ำหนักที่ ศสมช. พ่อแม่จะพาเด็กมา เราก็ให้ทันตสุขศึกษา บางครั้งอาจเป็นกลุ่ม หรือรายบุคคลตามโอกาส อสม.ช่วยจ่ายฟลูออไรด์ พอชั่งน้ำหนักเสร็จ ก็สอนกว้าง ๆ " "ปกติประชุม อสม. เป็นประจำทุกเดือน ไม่ได้จ่ายเบี้ยเลี้ยง"	This health worker, age 23, has three years experience as a dental health officer. "Dental health activities for preschool children age 0-5 years include giving information to volunteers at meetings in order to disseminate information to people in the village. The issues concerned brushing, the benefits of fluoride, beneficial food for teeth and including nutrition and snacks."

Table 4.29 (Continued) Case report of health officer interview

"อสม.ได้สิทธิในการรักษาฟรีทั้งครอบครัว"	"At primary community health care centers, parents bring children for weighing. I provide health education through group instruction and one-on-one counseling."
"กิจกรรมของอสม.เป็นผลมาจากโครงการทันตสาธารณสุขใน ศสมช. ที่เริ่มเมื่อ 2 ปีที่แล้วที่หมู่บ้านนี้ ครั้งแรกมีงบประมาณมา 500 บาท อบรม อสม. 1 วันที่สถานีอนามัย ปีที่ 2 เขาก็ทำมาตลอดไม่ได้ใช้งบประมาณ การอบรมปีแรกมีการอบรมให้ตรวจฟันได้ด้วย ปีที่ 2 ไม่มีตรวจฟัน ให้จ่ายฟลูออไรด์อย่างเดียว"	"Health volunteers helped in giving fluoride and weighing children."
"ปกติ อสม.จ่ายฟลูออไรด์มักไม่ได้ตรวจช่องปากอยู่แล้ว"	"Normally, we have volunteer meetings once a month, with no per-diem."
"ไม่จ่ายเบี้ยเลี้ยง"	"Health volunteers received health cards for their families."
"การให้ความรู้ในคลีนิคเด็กดีทำได้ยาก เพราะมีเจ้าหน้าที่อยู่ 2 คน"	"Some health volunteer activities were affected by the dental program in the primary community center which starts at the age of two years in this village. The first year received a budget of 500 Baht for one-day training. A budget wasn't allocated the second year. The activities continued. The first-year activities included child oral examinations and distribution of fluoride."
"พี่เจ้าหน้าที่สาธารณสุขช่วยแจกแปรงให้กับเด็กอายุ 1 ปีครึ่ง แต่ไม่ได้แนะนำอะไรมาก"	"The oral health instruction in pediatric clinics was difficult to perform because there were only two health officers."
"คนท้องรายใหม่จะได้มาตรวจฟันและนัดมาขูดหินปูน ฟันผุส่วนมากอุดไม่ได้ ถ้าต้องถอนจะส่งต่อไปโรงพยาบาล เพราะอาจมีการเสี่ยงมากกว่า กลัวคนท้องจะเป็นอะไร"	"Other health officers assisted in distributing toothbrushes for children age one and a half but didn't educate parents."
"เคยมีการรณรงค์ด้านทันตสุขภาพ ช่วงกีฬาอสม. มีการประชุมใหญ่ โดยเดินขบวนถือป้าย"	"Pregnant women who came to the pregnancy clinic for the first time received oral examinations and made appointments for calculus removal."
"การสนับสนุนแปรงจากสสจ.มีอย่างต่อเนื่อง ฟลูออไรด์จะไปรับจากสสจ ก่อนช่วงชั่งน้ำหนัก แล้วแจกจ่ายให้สอ. อื่น ๆ ด้วย"	"On Health Volunteer Day, there was a dental campaign parade."
"ปัญหาฟันน้ำนมผุในเด็กเล็กจะไม่ค่อยเห็น แต่จะเห็นตอนเข้าโรงเรียนประถมฟันจะผุ"	"I didn't find many dental health problems in preschool children, but found dental caries in primary school children."
"ปัญหาคือชาวบ้านไม่ค่อยจะมารับฟลูออไรด์เอง จะมารอรับแจงตอนชั่งน้ำหนักเท่านั้น"	"The problem was that villagers seldom received fluoride. They postponed the time for weighing their children."
"ท่านสาธารณสุขอำเภอเห็นด้วยทุกอย่าง แต่จะฝากงานอื่นให้ทำด้วย"	"The Provincial Health Office provided enough fluoride drops and tablets."
"ให้อสม.ช่วยแจกฟลูออไรด์ทุกหมู่บ้าน แต่บางหมู่บ้านอาจไม่ได้ผลเด็มที่ ขึ้นอยู่กับความสนใจของผู้ปกครอง ความสนใจของอสม. และคุณภาพอสม."	"The District Health Officer agreed to everything I did. He usually gave other job responsibilities to me, also."
	"In some villages, the outcome was ineffective. It depends on parental concern, health volunteer's concern and the quality of volunteers."

Discussion and summary

The factors associated to child dental caries were child age, child sex, parent's education, parent's age, and information received from volunteers.

Socio-economic factors often play roles as cofounders of the intervention evaluation.

Child age factors confirm the characteristic of dmfs index, which showed cumulative lesions in the time period.

Child sex factor may be explained by the results from qualitative data collected that boys may be self-indulgent. He didn't belief parent to stop taking toffee and didn't allow parent to control him brushing. This behavior may include high caries risk behaviors.

Children whose parents had a sixth grade or lower education had more caries than other groups. The proportion of this group was 79.9 percent. Most of these families lived in rural villages. Even though the geographic area factor was statistically insignificant, the priority for intervention should be on rural areas.

Parent's age had a negative relationship to child dental caries. After dividing parents into two groups, statistical tests showed that parents aged up to 38 were

associated with high caries status of their children. This group was made up of more than 62 percent of parents.

Information received from health volunteers was the single intervention of dental service effective in preventing dental caries in this study. Only 7.1 percent of sample parents had received fluoride information from health volunteers. This activity had many limitations. The outcome of activity depended on the unity of the health volunteer group and good cooperation. This activity also requires supervision and monitoring from health personnel. However, this activity was effective while other activities were ineffective. The promotion of dental health using volunteers is an alternative.

Mother and others divided the relationship between parents and their children. In model 2, this factor was a significant predictor of child dental caries. But after including others factors in the final model, this factor was insignificant. The explanation is that grandmothers had good experience in childcare. Care by grandmothers may affect child dental caries in the same way as care by mothers. A future study should compare the effects of mothers and grandmothers.

Receiving fluoride supplements was a factor, which had a negative effect on dental caries but was statistically insignificant. The effect of fluoride supplements also depended on the age when consumption commenced and the duration (Jinda Nantajivakornchai and Supreda Adulyanont, 1992). The effectiveness of fluoride

supplements will be increased by continuing consumption, which is also an impact of volunteer activities.

The policy simulation by simulating that all parents received fluoride information from health volunteers showed a 34 percent reduction of caries. This result was under the assumption that all other variables remained constant. In actual situations, one factor may change simultaneously with other factors. It is a multi-collinearity effect. A rule of thumb states that multi-collinearity is likely to be a problem if the simple correlation between two variables is larger than the correlation of either or both variables with the dependent variable (Pindyck and Rubinfeld, 1981). The correlation analysis found that information received from health volunteers had higher correlation with knowledge, attitudes, received toothbrushes, received fluoride, and information received from mass media and health personnel than dmfs. But it can be tolerated because the colinearity of independent were low (<0.3).

The final regression model explained and estimated dental caries status by multi-variables. The proportion of the variation in dmfs which is explained by multivariate in this equation was low (R^2 = .137). There are other variables that explain the dental caries status such as amount of bacterial *streptococcus mutans*, consumption of beverages containing sugar, and candy consumption (Grindefjord et al., 1996). These variables were absent in this exercise. However, no single variable can explain dental caries status. Another reason to explain the low R^2 is because this exercise was a cross-section study with large variations across individual units of observation.

Limitations and weaknesses

This exercise used the existing primary quantitative data, which was incomplete. Absent were main factors such as sugar consumption and microorganisms. So in this exercise, qualitative data collecting was conducted to understand how these factors; dietary habit, oral cleansing habit, and services approach relate to dental caries.

The result from sample data can conclude that received information from volunteer was effective to prevent dental caries. This conclusion based on limitation. There were some pairs of independent variable that had high colinearity but not perfectly colinear. The correlation between these variables more than the correlation with the dmfs. But it can be tolerate because of low colinearity. The another way to improve the function is to separate these independent variable which had high colinearity in separate function and test one by one.

Data from a cross-sectional study cannot thoroughly explain the dental caries status (dmfs) because of the cumulative characteristics of the dmfs index. However, epidemiologic data of dental caries still use dmft or dmfs index and cross-sectional survey still acceptable to define the dental caries status in population because of economy and feasibility to gather sample.

Data from qualitative data collecting can explain only selected cases. It might represent or not represent the populatio n. So the data may not generalize. The future design for quantitative data collecting should cover all significant data.

Recommendations

1. Due to dental caries is a multifactorial disease, the single-equation regression model can represent the production function of dental caries status.

2. The associated factors should be considered to be criteria for high caries risk groups such as:

- Parent's education. Because the child whose parent finished compulsory education or lower, had high dental caries.
- Parent's age. Because the parent's age was negative correlation to dental caries.
- Child sex. Because male had more dmfs than female at significant level.

3. The database for evaluation should be improved. The significant variable should be included such as milk bottle feeding, frequency of sugar consumption, the age of oral cleansing commences, The age of fluoride consumption commences, duration of fluoride consumption, and culture or beliefs which relevant to oral health.

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