

CHAPTER IV

DATA EXERCISE

Cost Analysis of Resin and Glass-ionomer Sealing Procedure in Mobile Dental Service for School Children and Rapid Assessment on School Dental Health Promotion and Preventive Program.

4.1 INTRODUCTION

Dental caries in school children is a major health problem in Thailand. Although Thailand has a strategy to cope with this problem, the problem remains mainly due to inappropriate implementation of the dental health promotion and preventive program (Dental Health Division, Health Department, Ministry of Public Health, 1999).

This data exercise will explain aspect of dental caries, dental health promotion and preventive program implementation as well as the cost of preventive procedure for pit and fissure sealing.

4.2 OBJECTIVE

The purpose of this data exercise is to gain experience on cost analysis of the sealant procedures and a rapid assessment on school dental health promotion and preventive program.

4.2.1 General objective

To gain experience in conducting (a) A cost-analysis, (b) In-depth interview, (c) Focus Group Discussion and (d) Observation technique.

4.2.2 Specific objectives

To define and compare unit cost between resin and glass-ionomer used as pit and fissure sealant in mobile dental service for school children.

To identify area for improvement of the dental health promotion and preventive program in Municipality school I, Buriram Province

4.3 DEFINITION

4.3.1 Dental health promotion and preventive program means:

Dental care activities to encourage good oral health and dental caries prevention provided in pre-school and primary school under the guidance of Ministry of Public Health consisting of activities as shown in Table 4.1.

Table 4.1: Dental Care Activities Provided for Pre-school and Primary School Children.

Dental care activities	Pre-school	Primary school
1. Tooth brushing after lunch	×	×
2. Oral fluoride tablet intake	×	-
3. Useful food preparation	×	×
4. Oral cavity examination	×	×
5. Make good environment to encourage dental health promotion (ie. Build the place for tooth brushing)	×	×
6. Dental health education	×	×
7. Dental sealant in first permanent molar	×	×

4.4 METHODOLOGY

4.4.1 Design.

This exercise is a combined study containing a cost-analysis and a rapid assessment using quantitative and qualitative approaches.

4.4.2 Study site and sampling

4.4.2.1 Site :

The study area was Municipality school I, in Mueng district at Buriram province.

4.4.2.2 Children :

The target population consisted of 1,121 children, the study population were 254 school children at the age between 5-6 years and the sample consisted of 30 children. They were selected by simple random sampling according to criteria described below.

- Screened 254 children aged 5-6 years in the Municipality school I.
- By using inclusion and exclusion criteria, 112 children were selected.
- Out of those 30 children were selected by using the simple random sampling technique.
- Then 15 children were selected by simple random sampling and #16, #36 were sealed with resin material and #26, #46 with glass-ionomer material.
- For the remaining 15 children #16, #36 were sealed with glass-ionomer material and #26, #46 with resin material.

Inclusion criteria :

Children with fully erupted permanent first molar teeth both upper and lower arch.

Exclusion criteria

Children who have dental caries in permanent first molar teeth even for 1 tooth.

4.4.2.3 Teachers :

Four teachers were invited for an in-depth interview, 1 school director, 2 class masters and 1 school health teacher. The director and school health teacher were selected by using purposive sampling technique, 2 class master were selected by convenience sampling, 1 from 6 of Kindergarten level and 1 from 24 of primary school level.

4.4.2.4 Parents :

Eight children's parents were invited to participate in Focus Group Discussion by purposive sampling. Half of them were the parents whose children study in Kindergarten level. The remaining were the parents whose children study in primary school level.

4.4.2.5 Field observation: Children's behavior on tooth brushing, food preparation and school facilities to promote good dental health were observed.

4.4.2.6 Document search: Children's personal medical record and the school annual report were analysed for cross checking.

4.4.3 Research techniques and instruments :

a) Quantitative :

Cost analysis ; The data about cost were collected during sealant application both resin and glass-ionomer.

Data collecting form for time cost.

Data collecting form for heavy instrument cost.

Data collecting form for hand instrument and others disposable accessory materials cost.

Data collecting form for sealing material cost.

b) Qualitative :

The data collection was done by the researcher, using the guidelines for in-depth interview, Focus Group Discussion and observation checklist and document search.

In-depth interview guideline

Focus group discussion guideline

Observation guideline

- Facilities checklist
- Activities checklist
- Behavior checklist

Document search guideline

- School children medical record
- Dental health and preventive program plan

4.5 RESULTS

4.5.1 Quantitative study result :

4.5.1.1 Demographic data.

The total sample was 30 children with 14 males (46.66 %) and 16 females (53.33 %). The proportion between male and female was 1:1.14 and mean age of the

children in this study was 76 months ($SD = 3.4840$) age range from 68 to 82 months. 11 children (36.66 %) attended primary school grade I and the remaining 19 children (63.33 %) attended grade kindergarten II. The demographic data of the sample are shown in Table No.2

Table 4.2: Demographic Data of the Children

No	Gender	Age (months)	Grade
1	F	68	K.II.
2	M	70	K.II.
3	M	76	K.II.
4	M	76	K.II.
5	M	75	K.II.
6	F	78	P.I.
7	F	79	P.I.
8	F	75	K.II.
9	F	79	P.I.
10	M	69	K.II.
11	M	78	K.II.
12	F	78	K.II.
13	M	75	K.II.
14	M	72	K.II.
15	F	75	K.II.
16	F	78	P.I.
17	F	75	K.II.
18	M	77	K.II.
19	M	78	P.I.
20	M	75	K.II.
21	M	72	K.II.
22	M	75	K.II.
23	F	79	P.I.
24	M	77	P.I.
25	F	74	K.II.
26	F	82	P.I.
27	F	73	K.II.
28	F	80	P.I.
29	F	81	P.I.
30	F	81	P.I.
Male =14 (46.66%) Female =16 (53.33%) Male:Female = 1:1.14		Mean =76 Mons (SD =3.4840) Range from 68 to 82 Mons	P.I. = 11 (36.66) K.II.= 19 (63.33)

* K.II. Means Kindergarten grade II and P.I. Means Primary children grade I.

4.5.1.2 Time cost

The time used for resin and glass-ionomer sealing was 2 days, each 6 hours per day, including sterilization, equipment preparation and equipment packing time, starting from 9.00 A.M. and finishing at 4 P.M., with a break for lunch from 12.00 A.M. – 1.00 P.M.

Counting with the chronometer at the beginning of the sealing process by the operator and stopped when each application was finished. The time used for resin and glass-ionomer sealing of all children is shown in Table 4.3.

Table 4.3: Time Used for Resin and Glass-ionomer.

No	Gender	Age (months)	Grade	Time used (minutes)		Remarks
				Resin (2 teeth)	Glass-ionomer (2 teeth)	
1	F	68	K.II.	9.13	8.29	Children number 1-15 were sealed with resin in the tooth #16,#36 and with glass-ionomer in #26,#46
2	M	70	K.II.	8.56	8.43	
3	M	76	K.II.	8.45	8.31	
4	M	76	K.II.	8.33	8.41	
5	M	75	K.II.	8.35	8.27	
6	F	78	P.I.	8.23	8.13	
7	F	79	P.I.	8.35	8.49	
8	F	75	K.II.	8.53	9.12	
9	F	79	P.I.	8.13	8.17	
10	M	69	K.II.	8.35	8.46	
11	M	78	K.II.	8.49	8.48	
12	F	78	K.II.	8.49	8.46	
13	M	75	K.II.	9.09	8.55	
14	M	72	K.II.	10.07	8.49	
15	F	75	K.II.	8.55	8.18	
16	F	78	P.I.	8.46	8.59	Children number 16-30 were sealed with resin in the tooth #26,#46 and with glass-ionomer in #16,#36
17	F	75	K.II.	9.01	8.22	
18	M	77	K.II.	8.54	8.49	
19	M	78	P.I.	8.46	8.37	
20	M	75	K.II.	8.22	8.03	
21	M	72	K.II.	9.12	8.53	
22	M	75	K.II.	9.22	8.49	
23	F	79	P.I.	9.25	8.42	
24	M	6/5	P.I.	8.57	8.49	
25	F	6/2	K.II.	8.11	8.12	
26	F	6/10	P.I.	8.45	8.01	
27	F	6/1	K.II.	9.06	8.49	
28	F	6/8	P.I.	8.13	8.01	
29	F	6/9	P.I.	8.58	8.09	
30	F	6/9	P.I.	8.48	8.01	
Total				258.76 minute/60 teeth	250.60 minute/60 teeth	

* K.II. Means Kindergarten grade II.

P.I. Means Primary children grade I.

The mean time for a resin sealing procedure = 8.6253 per 2 teeth SD =0.4347

The mean time for Glass-ionomer sealing procedure =8.3533 per 2 teeth

SD=0.2352

The activities timetable as shown in Table 4.4.

Table 4.4: Activities time table.

Date	Time	Activities	Period of time (minutes)
5 –6 Feb 2002	9.00 - 9.30	Heavy equipment set up	30
	9.30 - 12.00	Sealant application time (including sterilization and instrument preparation time) Lunch time	150
	12.00 –13.00		60
	13.00-15.30	Sealant application time (including sterilization and instrument preparation time)	150
	15.30-16.00	Heavy equipment packing time	30

◆ **Total time for working 2 days**

$$= 6 \text{ hours} \times 2 \text{ days}$$

$$= 12 \text{ hours} \times 60 \text{ minutes} = 720 \text{ minutes}$$

◆ **Total time used for sealant application of 30 children**

$$= (258.76 \text{ mins for resin} + 250.60 \text{ mins for glass-ionomer}) = 509.36 \text{ minutes}$$

◆ **Time for heavy equipment setting, sterilization, instrument preparation and heavy equipment packing**

$$= \text{total working time for 2 days (720 minutes)} - \text{total sealing time both resin and glass-ionomer (509.36 minutes)} = 720 - 509.36 = 210.64 \text{ minutes per 2 days per 120 teeth.}$$

◆ **Time for heavy equipment set up, instrument preparation, sterilization and heavy equipment packing per 1 tooth.**

$$= 210.64 \text{ minutes} \div 120 \text{ teeth} = 1.75 \text{ minutes / 1 tooth}$$

The mean time for resin sealing per 1 tooth = total time for resin sealing divided by number of teeth sealed with resin = $258.76 \text{ minutes} \div 60 \text{ teeth} = 4.31 \text{ minutes per 1 tooth}$

◆ **Added time for heavy equipment setting, sterilization, instrument preparation and heavy equipment packing**

$$= 4.31 + 1.75 = 6.06 \text{ minutes per 1 tooth.}$$

Therefore sealing time of resin application = 6.06 minutes per 1 tooth.

The mean time for glass-ionomer sealing per 1 tooth = total time for glass-ionomer sealing divided by number of teeth sealed with glass-ionomer = 250.60 minutes / 60 teeth = 4.17 minutes per 1 tooth

◆ **Added time for heavy equipment setting, sterilization, instrument preparation and heavy equipment packing**

= 4.17+1.75 = 5.92 minutes per 1 tooth

Therefore sealing time of glass-ionomer application = 5.92 minutes per 1 tooth.

◆ **Time cost calculation for resin application**

= Time cost per year / Number of sealed teeth per year

= Total salary of dentist, dental assistant and car driver / (52 wks × 5 days × 6 hrs × 9.90 teeth per 1 hour)

= (17,280+12,460+4,100) × (12 months) Baht per year / 15,444 teeth per year

Therefore unit cost for resin = 26.29 Baht per 1 tooth

◆ **Time cost calculation for glass-ionomer application**

= Time cost per year / Number of sealed teeth per year

= Total salary of dentist, dental assistant and car driver / (52 wks × 5 days × 6 hrs × 10.13 teeth per 1 hour)

= (17,280+12,460+4,100) × (12 months) Baht per year / 15,802.8 teeth per years

Therefore unit cost for glass-ionomer = 25.69 Baht per 1 tooth

4.5.1.3 Heavy equipment cost

Calculate in terms of unit cost by using depreciation rate (Sukalaya, 1995) as shown in Table 4.5.

Table 4.5: Heavy equipment cost calculation

No	Items	Purchasing price (Baht)	Depreciation (years)	Cost/Year (Baht/year)
1	Mobile dental unit	72,500	5	14,500
2	Portable dental chair	7,150	5	1,430
3	Mobile dental light	6,500	5	1,300
Equipment cost for resin sealing		=1+2+3 =14,500+1,430+1,300 =17,230 Baht/year		
Equipment cost for glass-ionomer		=2+3 =1,430+1,300 = 2,730 Baht/year		

◆ Unit cost of heavy equipment for resin application

= Cost per year / Number of sealed teeth per year

= Depreciation per year / Number of sealed per year

= 17,230 Baht per year / (52 wks × 5 days × 6 hrs × 9.90 teeth per 1 hour)

= 17,230 Baht per year / 15,444 teeth per year

= 1.11 Baht per 1 tooth

◆ **Unit cost of heavy equipment for glass-ionomer application**

= Cost per year / Number of sealed per year

= Depreciation per year / Number of sealed per year

= 2,730 Baht per year / 15,802.8 teeth per year

= 0.17 Baht per 1 tooth

4.5.1.4 and instrument and others disposable accessory material cost

Devided into 2 parts

a) Hand instrument (durable instrument) cost

Hand instrument cost calculation as shown in the Table 4.6.

Table 4.6: Hand instrument cost calculation

No	Items	amount	Purchasing Price (Baht/unit)	Total Cost (Baht)	Depreciation (years)	Cost/year (Baht)
1	Explorer No.21	15	350	5,250	5	1,050
2	Mouth mirror	15	50	750	1	750
3	Cotton plier	15	250	3,750	5	750
4	Stainless steel tray	15	250	3,750	5	750
5	Water cup	15	80	1,200	5	240
6	Mendrel and rubber cup	15	100	1,500	1	1,500
7	Stone round bur	15	120	1,800	1	1,800
8	Spoon excavator	15	350	5,250	5	1,050
Hand instrument cost for resin sealing = 1+2+3+4+5+6+7=6,840 Baht per year Hand instrument cost for glass-ionomer = 1+2+3+4+5+8 =4,590 Baht per year						

◆ **Unit cost of hand instrument for resin application**

$$\begin{aligned}
 &= \text{Cost per year} / \text{Number of sealed teeth per year} \\
 &= \text{Depreciation per year} / \text{Number of sealed teeth per year} \\
 &= 6,840 \text{ Baht per year} / (52 \text{ wks} \times 5 \text{ days} \times 6 \text{ hrs} \times 9.90 \text{ teeth per 1 hour}) \\
 &= 6,840 \text{ Baht per year} / 15,444 \text{ teeth per year} \\
 &= 0.44 \text{ Baht per 1 tooth}
 \end{aligned}$$

◆ **Unit cost of hand instrument for glass-ionomer application**

$$\begin{aligned}
 &= \text{Cost per year} / \text{Number of sealed teeth per year} \\
 &= \text{Depreciation per year} / \text{Number of sealed teeth per year} \\
 &= 4,590 \text{ Baht per year} / 15,802.8 \text{ teeth per year} \\
 &= 0.29 \text{ Baht per 1 tooth}
 \end{aligned}$$

a) Other disposable accessory material cost

Other disposable accessory material cost calculation as shown in the Table 4.7.

Table 4.7: Other disposable accessory material cost calculation

No	Items	Purchasing Price per unit (Baht)	Number of teeth can be sealed (teeth)	Unit cost/1 tooth (Baht)	Remarks
1	Pumice powder	170Baht/ 1,000Gram	935teeth	0.18Baht	1000g.=935small cup 1cup=1.06 gram 1 cup for 1 tooth so 1000g.=935teeth
2	Articulating Paper	180Baht/ pack (1 pack=432 pieces)	432 teeth	0.41Baht	1 pack=144 leaf of paper (1 leaf can be cut into 3 pieces) so 1 pack =432 pieces and 1 piece for 1 tooth so 432 pieces can be used for 432 teeth
3	Cotton roll	34Baht/pack	124 teeth	0.27Baht	1 pack can be made 1240 small pieces and 10 pieces can be used for 1 tooth so 1 pack can be used for 124 teeth
4	Disposable Saliva ejector	100Baht/ 100 pieces	1piece per 1 teeth =100 teeth	1 Baht	
Disposable accessory material for resin sealing $=1+2+3+4=1.86$ Baht per 1 tooth Disposable accessory material for glass-ionomer sealing $= 3 =0.27$ Baht per tooth					

◆ **Therefore hand instrument and disposable accessory material for resin application**

$$= \text{Hand instrument cost for resin sealing} + \text{Disposable accessory material for resin sealing} = 0.44+1.86$$

$$= 2.30 \text{ Baht per 1 tooth}$$

◆ **And hand instrument and disposable accessory material for glass-ionomer application**

= Hand instrument cost for glass-ionomer sealing + Disposable accessory material for glass-ionomer sealing

$$= 0.29 + 0.27$$

$$= 0.56 \text{ Baht per 1 tooth}$$

4.5.1.5 Sealing material cost

Calculate cost of resin and glass-ionomer as shown in the Table 4.8.

Table 4.8: Sealing material cost calculation.

Type of material	Package	Purchasing price per package (Baht)	Material used for 60 teeth	Cost per 1 tooth (Baht)
Resin (Denton [®])	1. Universal liquid 5.5 ml 2. Catalyst liquid 5.5 ml	3,500	6.3 ml	$3,500 \text{ B} \times 6.3 \text{ ml} / 11 \text{ ml per 60 teeth} = 33.40 \text{ Baht per 1 tooth}$
Glass-ionomer (Fuji III [®])	1. Powder 10 Gram 2. Liquid 10 Gram	3,550	12.8 Gram	$3,550 \text{ B} \times 12.8 \text{ g} / 20 \text{ g per 60 teeth} = 37.86 \text{ Baht per 1 tooth}$

◆ **Total cost per 1 tooth of resin sealing**

= Sum of the unit cost of time cost + heavy equipment cost + hand instrument and disposable accessory material cost + sealing material cost

$$= 26.29 + 1.11 + 2.30 + 33.40 = 63.14 \text{ Baht}$$

◆ **Total cost per 1 tooth of glass-ionomer sealing**

= Sum of the unit cost of time cost + heavy equipment cost + hand instrument and disposable accessory material cost + sealing material cost =

$$25.69 + 0.17 + 0.56 + 37.86 = 64.28 \text{ Baht}$$

4.5.2 Qualitative study result :

a) In-depth interview

From the in-depth interview technique it was found that teacher had different perceptions about major health problems. The class master at the kindergarten perceived malnutrition as a major problem in this school. She expressed that because of the poverty of parents, the children had insufficient dietary intake at home, and the school could not afford to provide food for the children. The class master at primary level perceived dental problems to be a major health concern, followed by mental health problem of students as the second problem. The school director said that malnutrition was a problem with a small number of children and she viewed it as a minor problem, compared to dental problems among children, whereas, the school health teacher considered systemic diseases such as fever and influenza as major health problems which she attributed to the broken family situations of the student. She further explained that some children stayed with single parents or with caregivers who were not their parents. These children were often left unattended when the parents or caregivers were working, and there was nobody to take care of their health needs, because of the broken family situation.

When the researcher asked about the first priority related to health promotion 3 of them said dental health problem should be given first priority to be solved at time, and dental health promotion is encouraged as it relate to general health, and disturb the learning ability of children only 1 class master said malnutrition should be the first priority.

All of the teacher knew about the dental health promotion and preventive program provided in this school and they confirmed there are the following activities in this school:

Tooth brushing after lunch activity

Fluoride mouth rinse activity

Oral examination activity

Health education

While only 1 class master knew about dietary fluoride supplement (oral fluoride tablet intake).

Most of the teacher said they did not add the dental health education program into the course syllabus, however they tried to teach the children informally by using question and answer session in the morning at National Song Respect Ceremony (not added to the course syllabus)

Two class masters said they conducted oral cavity examination of the students by themselves and record only when they had to file the report to municipality.

All of them said they encouraged to make a good environment for dental health promotion and preventive program by making a place for tooth brushing, public relations board for announcing the useful information including dental health education and also questions and answers about health every morning, after the children offer respect to the national song ceremony.

All of the teachers confirmed that the children had the after lunch brushing activity everyday and every child had toothbrush on their own.

Three of them including the school health teacher said that they faced the problem about food and drinks which have a negative effects to dental health such as sale of candy in the cooperative grocery and also in the canteen.

Verbatim (T1) “We have the cooperative grocery at the school and candy, sweet and confection are sold in this grocery that which is bad for dental health, but I can not stop it because the cooperative grocery administrator always tell me that this is the major income for our school and candy is a best seller. Even if we stop selling candy at school the children can buy it outside the school both in the morning and evening, however I try to reduce the candy in this grocery.”

Another problem are soft drinks as pointed out by some teachers.

Verbatim (T2) “ I think Sundew® is bad for dental health but I can not stop it because it offers very much benefit to school”

Verbatim (T4) “ Sundew® is bad for health but I can not stop it, it’s politics”

b) Focus Group Discussion

All of the children’s parents said they knew that there are dental health promotion activities and preventive program provided in this school and they can give the example :fluoride application, fluoride mouth rinse, tooth brushing and a dental health education.

Most of them knew that there is a dietary fluoride supplement (oral fluoride tablet intake) program in this school but some of them did not know.

Most of them agreed with this program and they thought it's good for their children. Some of them said that pit and fissure sealant made the teeth healthy and resisted to dental caries. One of them said the teacher should pay more attention to children about dental health surveillance.

All of the parents believed that the teacher taught their children about how to brush their teeth and most of them also believed that the school provided brushing after lunch activity because they have seen their children bringing a toothbrush from home and some of them have seen the brushing activity at school.

All of them said the school should include dental health promotion activities

Verbatim (P4) "It is good and useful for health not only dental health but also general health since oral cavity is the first gate to the whole body if oral cavity is healthy so that the whole body might be healthy."

All of the parents agreed that it's important that health promotion activities are parts of the school curriculum because if the children's health is good then they have a strong body and mind and affect directly their learning.

All of them knew the oral health status of their children and they can explain more detail about their children's oral cavity status and some of them said the teacher did not report the children's oral status to parents, however, the parents knew the oral status because they checked the children's oral cavity by themselves.

All of the parents knew about the food provided at school and they can give the example of such food and they said some of the food was not good for dental health.

Verbatim (P1) " I know the school provides noodle, rice gruel, vermicelli eaten with a pepper curry (Ka-nom jene), snack , sweet, candy and preserved fruit and I expected the school provided the children with fruits."

All of them believed that the teacher did not examine their children's oral cavity because the children did not tell them about that and some of them said only when the dentist came to school, oral cavity examination would be occurred.

Most of them said they should ask the children at home " Did you brush your teeth at school?" everyday, in this way it will re-enforce dental health promotion education and activities.

One of them said we should ask for the teacher to provide the dental health promotion activities at school and examine the dental status every two weeks and ask for dentist to come to school every month.

Some of them said they wanted the school having a “beautiful teeth contest” so as to encourage the children to look after their teeth for competition in the contest that would make the encouragement to dental health promotion.

One of them wanted the teacher to examine the children’s oral cavity every week and inform parents about children oral status, this also could encourage dental health promotion.

c) Observation

The check list provided following observation on dental health facilities. The school had a tooth brushing place, it was appropriate and is used for multipurposes, not only for brushing but also for other purposes. Reserve tanks provide water supply for this place.

A public relation board was observed but no dental health information was included.

The check list provided following observations on dental car activities. When the activities which encourage the dental health promotion and preventive program were observed, the researcher found that the school did not have any signals or other signs to encourage the children to brush teeth. whenever children wanted to brush they can go and do it and no school health volunteers or teachers control the brushing activity or provide demonstration. When I observed the National Song respect

ceremony in the morning I saw a question and answer session but on general knowledge not dental health knowledge.

Check list outcome on toothbrush belongings to the children. One hundred percent of the children in kindergarten had toothbrush on their own but on average only 65.47% in primary school children. (see in the Table 4.9.)

Table 4.9: Toothbrush Checklist

Grade	Class	Total No of children	No. of children who absent	No. of children who came to school	No. of children who have toothbrush	%
Kindergarten Grade I	1/1	39	1	38	38	100%
	1/2	38	-	38	38	100%
	1/3	38	2	36	36	100%
Kindergarten Grade II	2/1	37	4	33	33	100%
	2/2	37	2	35	35	100%
	2/3	38	-	38	38	100%
Primary Grade I	1/1	36	-	36	28	77.77%
	1/2	36	3	33	27	81.81%
	1/3	35	1	34	25	73.52%
	1/4	35	-	35	22	62.85%
Primary Grade II	2/1	37	1	36	19	52.77%
	2/2	35	1	34	23	67.64%
	2/3	34	-	34	17	49.99%
	2/4	37	1	36	24	66.66%
Primary Grade III	3/1	40	-	40	21	52.5%
	3/2	40	-	40	16	40.00%
	3/3	40	-	40	25	62.5%
	3/4	40	2	38	30	78.94%
Primary Grade IV	4/1	43	2	41	24	58.53%
	4/2	42	-	42	35	83.33%
	4/3	39	2	37	31	83.78%
	4/4	40	1	39	29	74.35%
Primary Grade V	5/1	38	3	35	10	28.57%
	5/2	37	1	36	15	41.66%
	5/3	37	1	36	11	30.55%
	5/4	37	-	37	12	33.43%
Primary Grade VI	6/1	34	1	33	11	33.33%
	6/2	37	-	37	9	24.32%
	6/3	34	2	32	15	46.87%
	6/4	34	1	33	18	54.54%
Total		1121	29	1092	715	65.47%

Check list outcome on tooth brushing activity. One hundred percent of kindergarten compulsory brush their teeth under supervision of the class master, but from my observation only 19 from 37 primary children (51%) went to brush after lunch as shown in the Table 4.10.

Table 4.10: Observation Result on Tooth Brushing Behavior of Primary School Children (Primary school grade I and grade II)

Group No.	Number of children	Gender	Grade	Number of children who brush after lunch	Percentage
1	7	Male	Grade I	4	57.14 %
2	4	Female	Grade II	2	50 %
3	6	Male	Grade II	1	16.66 %
4	8	Female 3	Grade II	2	50%
		Male 5	Grade II	2	
5	7	Female	Grade I	5	71.40 %
6	5	Female	Grade I	3	60 %
Total	37			19	51.35 %

Check list outcome on dietary fluoride supplement. All pre-school children took dietary fluoride supplement after brushing and before going to sleep in the afternoon under the supervision of the class master.

Check list outcome on food which had negative effect to dental health. Rice with curry, fruit, water melon, fried chicken, Northern Thai Ipomoea batatus (Mun-keaw), vermicelli eaten with a peper curry (Ka-nom jene) were observed. It's useful for health and dental health but there was also syrup, candy, ice-cream and carbonated sweet soft-drink being sold in the cooperative grocery as shown in Table 4.11.

Table 4.11: Food with Negative Effects for Dental Health Provided by Co-operative Grocery.

Kind of	Item of food which have negative effects for dental health						
Drink	Coke®	Fanta®	Sprite®	Pepsi®	Syrup	Mirinda®	Team®
	✓	✓	✓	✓	✓	✓	✓
Snack	Candy	Chocolate	Pote®	paprika®	corne®	Halls®	Cuka®
	✓	✓	✓	✓	✓	✓	✓
Dessert	Ice cream	Sweet	Ice syrup				
	✓	✓	✓				

d) Document search

When the secondary data from document was observed, children's personal health card which recorded medical and oral status was found and this card was kept at school.

A report copy of oral cavity examination report was found, this document is used for reporting to the municipality.

The teacher did not report the children's oral status to their parents because there are no records on the oral status of the children in the annual school report card which is sent to children's parents every year.

Pit and fissure sealant application records were observed in children's personal health card.

A copy of tooth brushing activities report was found in this school.

Oral fluoride tablet intake record and copy report of kindergarten children was found. The outcome as shown in Table 4.12.

Table 4.12: Health Documents Maintained at Municipality School I.

Document search	Planned dental health program	Document available in this school
1. Annual school report (to parents) - Medical history record and oral status	×	-
2. Medical record (keep at school) - Pit and fissure sealant record.	×	×
3. Oral cavity examination and activity report (to Municipality) - Oral status - Dietary fluoride supplement - Tooth brushing activity	× × ×	× × ×

4.6 DISCUSSION AND CONCLUSION

Discussion

This study used the straight line method to calculate depreciation because it's the most simple but very popular and practical in general using and also recommended by Canadian Hospital Association. The study did not concern about indirect cost such as maintenance cost this could affect the results.

Factors affecting the cost of sealing procedure are related to the process and technique of application in this study, for example, sealing material cost although the purchase price of these two materials is not different but material cost per one tooth of glass-ionomer is more expensive than resin, it's possible that when the dental assistant mixed the powder and liquid of glass-ionomer the volume of mixed material one time is used for using 3 teeth but in this study the operator applied only 1 tooth in each time of mixing and loss the remaining material (material cannot be applied after it became hardening) material cannot be applied 2 teeth at the same time because it's very difficult to control moisture both upper and lower jaw at the same time, but for resin, the volume of mixed material one time is used for 2 teeth and also in this study the operator cannot apply 2 teeth at the same time, so only 1 tooth was applied in each mixing time and loss the remaining material (material cannot be applied after it became hardening). So if all of the volume of material can be used each time of mixing, it might be cheaper in both material especially glass-ionomer.

For heavy equipment cost, factors that might be influence to the difference of equipment cost of resin and glass-ionomer is the brand and price of heavy equipment, because resin application needs heavy equipment more than glass-ionomer, so if the costly mobile dental unit was used therefore the heavy equipment cost per 1 tooth of resin must be higher than that of glass-ionomer, but in this data exercise the unit cost of heavy equipment for resin and glass-ionomer is not quite different because the reseacher used the low price mobile dental unit which made in Thailand (Available in Buriram Province), in this case if another brand from Europe, USA or Japan which

more expensive than local made equipments were used it might be quite different in a results and this also the same reasons in the unit cost of hand instruments.

However, there are some of the limitation in this study as following ;

The study focused on the students, teachers and children's parents in Municipality school I., It could not be generalized to the whole population in the other parts of Buriram Province.

The sample size is only 30 school children because of the limitation of time for study and this sample size is not represent the whole population.

From observation the percentage of children who had their own toothbrush is 65.47 this problem becomes bigger from Primary school children grade I (81.81%) to grade VI (24.32%), it might come from that the school did not provide the toothbrush for children and the Primary school children grade I still have their own toothbrush because they have just come from Kindergarten level which the school provided toothbrush to all children in this level and compulsory them to brush their teeth so this behavior still remain in Primary school grade I level and decrease in the years later because of nobody compulsory them.

Because of above reason the percentage of tooth brushing activity of Primary school grade I and II children from observation was only 51% compare with 100% of the kindergarten children.

For useful food preparation, from the observation there were some foods which not good for dental health provided in this school. Although the children's parents and all of the teachers knew the negative effects of such a food, but nobody can solve this problem even the school director because it provided a good benefit in terms of money to the school.

About good environment making to encourage dental health promotion, although all of the teachers insisted that the school provided a place for tooth brushing, public relations board for announcing the useful information including dental health education and also questions and answers about health every morning, after the children offer respect to the national song ceremony, but from observation only a place for tooth brushing was observed to be prepared for tooth brushing activity. Although the public relations board and questions and answers about health every morning activity was observed but there was no information about dental health. It's possible that it was not the turn of dental health information at the date of observation or the school did not do it but the teacher wanted to please the researcher. The other things that have not been seen in the observation was the school did not have any signals or other signs to encourage the children to brush. whenever children wanted to brush they can go and do it and no school health volunteers or teachers control the brushing activity or provide demonstration.

For dental health education, Although all of the parents believed that their children were taught about dental health education by the teachers although the teachers confirmed that the dental health education was performed in the morning by using

question and answer session at National Song Respect Ceremony, but the researcher did not see dental health education providing in that ceremony at the date of observation only the general knowledge was observed and there was no document to ensure that the school provided this activity. It's possible that the school might or might not provide dental health education (the time constraint, the researcher could not observe everyday)

Conclusion

There is no significant difference between resin and glass-ionomer used as pit and fissure sealant in mobile dental service for school children. There are 4 areas for improvement of dental health promotion and preventive program of the Municipality school I ; (1) tooth brushing activity in the primary school, (2) food preparation, (3) create good environment for dental health and (4) dental health education.

4.7 LESSON LEARNED

1. Time counting: Time counting by using chronometer and handling by the operator is not appropriate, because sometime the sealing procedure finished and the operator concentrated in the procedure and forgot to stop the chronometer so it affects the results.
2. It's more useful if this data exercise categorized the children into 3 groups classified by the severity of the dental caries, Mild, Moderate and Severe.
3. Development of guidelines : I felt the importance of proper development of guideline of in-depth interview, focus group discussion, observation and

document search. It took me a long time to develop these guidelines and I tended to collect more information than I needed at some points and inadequate at some points.

4. Triangulation method: It's very useful to cross check and confirm the findings. The qualitative methods were very useful to find out the perception and actual implementation of dental health program.
5. Focus Group Discussion conducting: It's very difficult to invite eight children's parents to participate in Focus Group Discussion because it takes time and people don't want spend too much time for this.
6. In-depth interview technique: It might be better if the interviewer is not a dentist because when the teachers knew the interviewer is a dentist, they might try to please the interviewer with a good image.

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