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The prevalence and extent of school absences and factors related to absences caused by dental conditions and dental care in Thai schoolchildren

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"The beginning is the most important part of the work"

Plato

ABSTRACT

Background. The prevalence and extent of school absences and factors related to the absences caused by dental conditions and dental care in schoolchildren has not been fully explored. School absenteeism is a potential marker for dental related quality of life of children.

Objectives. To determine the prevalence and extent of school absences and factors related to the absences caused by dental conditions and dental care in 10-12 year-old Grade 5 children in Lampang province, Thailand.

Methods. Longitudinal study using multi-stage sampling on sample of 1,158 children in 8 state, 3 municipal and 6 private schools. Data on absences collected for one school year were obtained by recording daily school absences and recording time for dental care in school dental service clinics. Questionnaires administered to children and parents on school absence and dental impacts. Oral examinations were done to assess dental status.

Results. Caries level was low (DMFT 1.4±1.7). Prevalence of school absences for all dental reasons was 22.5%. The mean school absence per year for dental care was 434 hours (613 hours when dental screening included) per 1,000 children. Average time missed per child was quite low; 23 minutes. School absence for dental reasons paled into insignificance compared to medical and social reasons. Significant predictors for school absence for dental reasons were mother's educational level, family income, school type, dental care scheme and presence of decayed teeth. 83.2% had experienced a dental impact. Eating was the most commonly affected performance (67.2%) and 19.3% children had their studying affected. Decayed teeth were a significant predictor for dental impacts.

Conclusions. The level of school absence for dental related conditions and care was low per child but cumulatively was considerable. School absence for dental reasons was associated with dental health status. Family related factors and dental care system also affected the prevalence of school absence for dental reasons.

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CHAPTER 1

INTRODUCTION

1 INTRODUCTION

The United Nations declared that health and education are basic human rights along with the right to adequate food and housing (Department of Public Information 1998). Health and education are two elements that improve people's lives. Living with a healthy body and mind, developed through education provide skills and values required for better living (Pongpaiboon 2005) which in turn opens up more opportunities, enhances the quality of life. Health and education are closely interrelated. Education, promotes health in some specific ways. For example improved education increases awareness of health and hygiene and consequently leads to a better quality of life (Dreze and Murthi 2000; Munch and Svarer 2005).

Many policy makers aim to improve health and increase people's literacy level. Educators agree that enhancing educational standards can be achieved by improving school standards, school attendance, children attention and class attainment as well as creating a good school environment (Rowe and Rowe 1992; Levinger 2005). In particular, school attendance has become a major concern of policy makers, politicians, educators and parents (Munn and Johnstone 1992; Reid 2005) mainly because absenteeism leads to a loss of opportunities to learn and has negative long-term consequences. High levels of absence from school are associated with a higher risk of school failure or poor academic results (Raffe 1991), dropping out of school, offending behaviour, substance abuse, and other high risk behaviours (Robins and Ratcliff 1978; DeKalb 1999; Maryland State 2003).

Absence from school has many causes. Demographic factors such as sex, family structure, lifestyle, neighbourhood and school environment are related to school absence (Cook et al 1985; Fowler et al 1985; Weitzman 1986; Weitzman et al 1986b; Fowler et al 1987; Klerman et al 1987b; Edward and Malcolm 2002; Malcolm et al 2003). Health problems also cause school absence. Indeed, health status is a leading cause of school absence. Health has been one of the main

research topics about causes of school absence. Many studies have confirmed that illness is a significant cause of school absenteeism and causes a high prevalence of absence among school children (Collin et al 1985; Weitzman 1986; Weitzman et al 1986a; Weitzman et al 1986c; Nettleman et al 2001). Chronic illnesses (Brook and Heim 1993) and respiratory illnesses (Spee-van-der-Wekke et al 1998) are the leading causes of excessive absenteeism.

Dental problems are a cause of school absenteeism. Dental diseases are one of the highly prevalent health problems among young children (Lalloo 1998; Alvarez-Arenal et al 1998; Slade 2001; Vargas et al 2002; Azogui-Levy et al 2003; Nomura et al 2004; Jamieson et al 2004; Skaret et al 2004). Data from the Australian Health Survey (Spencer and Lewis 1988) and a study in the US showed that high number of school days were lost annually because of dental problems and dental visits (Gift et al 1992).

It appears that, based on data available on school absence and on the prevalence of dental pain in children, there is a correlation between non-attendance at school and prevalence of dental problems (Reisine 1985; Gift et al 1992). However, few well conducted studies have been done to assess school days lost due to dental pain and treatments. The problem of school hours lost is of importance because if lower socioeconomic groups have more dental disease (Vargas et al 2000; Slade 2001), and lose many more hours of schooling as a consequence, they will be further disadvantaged by missing lessons. Interestingly, a study in the UK points out that potential school absentees ordinarily start the habit of non attendance when they are at primary school (Office of Standards in Education 2001). Therefore, addressing the problem of school absence at an early stage may prevent the problem becoming deep-rooted (Office of Standards in Education 2001; Zhang 2003). Hence, finding out the extent of hours of schooling missed due to dental conditions and dental care may be used to develop policies to remedy some part of the school absence problem.

Another problem that has not been adequately addressed in relation to dental health and school absence is that as children spend significant amounts of childhood time in school, school absence can be used as one of the practical markers to measure the impact of oral health on children's lives as is done in the medical field. In the medical field school absence has been used as the marker for quality of life of children with medical illnesses (Weitzman et al 1982; Anderson et al 1983). Importantly, the traditional oral health status measures, which are assessed by clinical indicators, are only sensitive to clinical status and pay relatively little attention to the social dimensions of oral disease. On the other hand, socio-dental indicators assess the impacts of the mouth and teeth on daily functioning; how disease interferes with day to day living (Leao and Sheiham 1995) or disrupts normal social role functioning and causes major change in behaviours such as an inability to work or attend school (Reisine 1981; Locker 1989). The latter, namely, the extent to which oral health related problems in children and their treatment disrupts normal social role functioning and causes major change in behaviours, such as an inability to attend school, is the subject of this thesis.

There are numerous studies about causes of school absence and some studies quantify the prevalence of school absence caused by social factors (Chapar et al 1988; Rothman 2001; Jayachandran 2002; Zhang 2003), medical reasons (Bener et al 1994; Doull et al 1996; Gilliland et al 2001). However, few have quantified school absence caused by dental problem or visits (Gift et al 1992). Moreover, dental policy makers appear to pay little attention to the problem. This is especially true of school dental services since most school dental services are available mostly during school hours (Headquarters of Dental Public Health 1997) and children lose some school time to use the school dental service.

Schools and local authorities have a responsibility to promote and encourage all students of school age to make the most of the educational opportunities provided to them. Various solutions have been introduced to reduce absenteeism, for example, most schools set up the guidelines to manage school attendance

(Rothman 2001; Reid 2002; Malcolm et al 2003). If children are already missing school hours for other unavoidable reasons, every effort should be made to minimize school absence. School dental services should not further increase school absence. This thesis sets out to quantify the extent of dentally related school absence so that decision makers can assess the extent of such absence. In addition, factors related to dentally related school absence will be analysed.

This thesis is divided into five major chapters, literature review, school dental services in Lampang, hypotheses and objectives, methods, results and discussion and conclusions. The literature review provides a review of the importance of education, causes and effects of school absence, the prevalence of school absenteeism caused by health problem including dental problems; the attempts to reduce absenteeism are also discussed. Furthermore, the justifications of considering school absence in school-aged children as one of the measurements of children's socio-dental impact are discussed in Chapter 2. The next chapter, the main hypotheses and objectives are presented. The School Dental Services and the general dental care scheme in Lampang provision is described in the following chapter. In the methodology chapter, research methods applied in the study, pilot studies, research instruments and data analysis are also outlined and demographic information about location of the study and the study population are presented. The results chapters describes details of reliability of the clinical and non-clinical data, descriptive analysis of data, associations between outcomes and other main findings in the study before and after controlling for explanatory variables. In the next chapter, comparisons of this study's finding with other studies related to this field are presented. The thesis finishes with conclusions and discusses the possible implications of the findings for dental public health and related authorities and makes suggestions for future studies.

CHAPTER 2

LITERATURE REVIEW

2 LITERATURE REVIEW

A main aim of this study is to assess the inter-relationship between school absenteeism and dental health and dental treatment. It is therefore necessary to review the importance of education in general, and then explore the concept of absenteeism and various factors which relates to school attendance before discussing education in relation to dental health. A review of school dental services in Thailand and other countries is done because their organization has implications for school absence. The last topic in this chapter discusses why school absence caused by dental problems should be considered a sociodental indicator; a measure of how oral status affects children's quality of life.

2.1 Literature review on school absence

2.1.1 The importance of education

Education makes the most of people's abilities and interests in the world. Knowledge, skills and values required for better living and sound and sustainable development, can be achieved through education (Pongpaiboon 2005). Three major rationales for literacy are mentioned by most nations. First, an economic rationale, additional years of schooling lead to economic benefits that are greater than the cost of the education itself. In developing countries, there are many claims of minimum rates of literacy specified as a prerequisite for economic growth. Second, the social rational, for instance, increasing the literate population, especially in developed countries can minimize rates of welfare dependency and lower social disintegration. The third aspect is the political rationale. Education and politics are closely related.

Education is important for all countries and each country should have their own education curricula depending on their socioeconomic, cultural and political

circumstances. Because this study was conducted in Thailand it is essential to describe the educational system in Thailand in order to provide a clear view how the education system is regulated and provided to children and to make it easy to understand the differences between school types.

2.1.2 Educational administration and management in Thailand

Thailand has formulated strategies and frameworks for action on development, particularly on education. One of the policies in education completed in 2002 is the extension of compulsory education from 6 years to 9 years; from primary classes (Prathom 1- Prathom 6) to lower secondary classes (Mathayom 1 - Mathayom 3). Parents are obligated to provide children with at least the compulsory educational level. In addition, at present, the government has provided exemption from tuition fees to those in primary classes at government schools as well as in lower secondary classes in government extended opportunity schools (Pongpaiboon 2005) Although Thai children have equality in attending school, there are differences between each school type (Jitsatiworarat and Limsintaopas 1997).

In this research, three types of primary schools were selected namely, state schools, municipal schools and private schools in an attempt to assess the differences in results between children in each school type. What follows describes the differences in characteristic of children enrolled in each school type.

Parent's preference in enrolling their children in different school types vary. In general, children from middle social classes or higher go to two types of school: The first is large urban state schools because the good reputation of academic success and also the tuition is supported by the government if a parent work in government authorities. The second preference is private schools. Lower to lower-middle class families who live in suburbs mainly enrol their children in suburban state schools near their neighbourhood because of transportation and cheap cost of

schooling. On the other hand, Municipal schools are preferred by lower middle class or blue collar workers who reside in urban areas because the cost is much lower than attending urban state schools or private schools. More information about the differences between schools types are described in Chapter 4.

2.1.3 The importance of school absence

Regular school attendance is vital for success at school. Good attendance habits will advantage children's further education and work in later life because it builds up the habit of getting up and starting a new day (Rothman 2001).

School absence management is one of the top priorities for educational departments. Every day a large number of children are absent from schools especially in big cities (DeKalb 1999). In New York City, 150,000 out of 1,000,000 students are absent daily (Garry 1996). In 2003/2004 academic year, there were 5.49 % of 3,617,430 of day students of compulsory school age in maintained Primary Schools in England, absent for half a day from school. That is 60,085,000 of total sessions missed (Department of Education and Skills 2004). School absence is the useful marker of children's difficulty in coping with their lives. Excessive school absence may suggest health problems for instance poor management of chronic illness, improper reaction to minor illnesses and it may signal severe family dysfunction, social problem as depression, teenage pregnancy, drug addiction or unfavourable school environment (Weitzman et al 1982; Klerman 1988).

2.1.4 Types of school absence

School absences are categorised in different ways by different studies. In this review school absence is divided into two board categories; authorised school absence and unauthorised school absence.

The definitions of these two types of school absence provided in DfES Circular (Department of Education and Skills 1999) are; "Authorised school absence is where the school has either given approval in advance for a pupil of compulsory school age to be away, or has accepted an explanation offered afterwards as satisfactory justification for absence", which can be caused by health matters or social matters. And unauthorised absence refers to "all other absences" that are the absences that have not been authorised by school or no valid explanation given; note that in this review truancy is included in the later category. Among young children of primary school age and under, the type of absence mostly found is authorised school absence, because children are still dependent and rely on their parents (Malcolm et al 2003).

2.1.5 Tackling school absence

Most schools set strategies to deal with school absence (Reid 2005). In UK, it is required by law that schools need to check student attendance two times per day (Department of Education and Skills 2005) and a student attendance software programme has been used to provide up-to-date information (Reid 2005). In some countries, parents of children of compulsory school age are requested by law that their children go to school regularly and failure to comply with this responsibility leads to prosecution (Baker et al 2001; County of San Bernardino 2001; Department of Education and Skills 2004). For primary schools in Thailand, there is no standard regulation on managing absenteeism. In most schools if a student does not appear at school for 3 consecutive days without any sensible reason, the

class teacher will contact the parent of the child. Moreover, students are required to attend at least 80% of the school time to be permitted to sit in the final examination to get the grade and pass to the next academic level (Pongpaiboon 2005).

2.1.6 Effects of school absence

School absence does not affect only a child but also the whole society. When children miss school, it is not only academic work that they lose out on; but they also lose out on the social side of school life which can affect children's ability to maintain friendships and socialization. Furthermore, absentees who regularly miss school for no good reason have a high tendency to be drawn into antisocial behaviours or crime (Robins and Ratcliff 1978; DeKalb 1999; Maryland State 2003).

2.1.6.1 Academic effects

Academic effects are the direct effects of school absence. The entire process, of education requires a regular continuity of instruction: classroom participation, learning experiences, supervised study, and homework, all in order to reach the goal of maximum educational benefit for each student. Frequently absence can lead to underachievement in schooling (Anderson et al 1983; Ohlund and Ericsson 1994) because school absence breaks the continuity of learning process and it might also have long term affect on their learning in later classes particularly if they miss a crucially important class (Malcolm et al 2003).

In some studies teachers thought that truancy affects regular attenders because when the absent students return to school they are more likely to be disruptive and demand teachers' attention (Malcolm et al 1996; Rothman 2001; Malcolm et al 2003). Teachers may have to repeat lessons which other students may think are a

backward step. Sometimes children who sit next to the absent child may be interrupted by being asked for instruction to finish the assignment while the lesson is proceeding. In contrast, Malcolm and Thorpe (1998) found that good attenders were not much affected by absentees (Malcolm and Thorpe 1998). Certain teachers commented that helping poor attenders to catch up added more work loads to them (Malcolm et al 2003). And both schools and teachers would get a bad reputation if the absentees can not do well in their examination (Malcolm et al 1996; Malcolm et al 2003).

2.1.6.2 Social effects

Absentees tend to have various social problems. Students who were often absent from school have trouble making and keeping friends. Moreover children disliked friends who are not being with them, therefore the friendship of poor attenders is weak and they become isolated (Malcolm et al 2003). Consequently, absentees miss opportunities to develop communication and language skills that are essential for socialisation. On the other hand, they also cause problems to the society; there is tendency for frequent absentees to have less confidence. School staff reported that when absentees return to class and found that they are not up to date with class work and cannot contribute to the class they may became irritable, frustrated, insecure and badly behaved. Their performances dropped and lead to loss of confidence and self-esteem. Later on, children will seek attention by getting involved in disruptive behaviours for example, drug addiction or become prematurely sexually active leading to teenage pregnancy (Malcolm et al 1996; Malcolm et al 2003; Reid 2005).

2.1.6.3 Economic Effects

The economic effects of school absence encompass direct costs and indirect costs. The former cost is that money needs to be spent on funding to improve school attendance for instance, developing new attendance software systems or setting attendance improvement projects (Reid 2005) or fees paid for court in truancy prosecutions (The Colorado Foundation for Families and Children 2002). However, the indirect costs may even be larger; frequent school absentees may be involved in anti social behaviours and juvenile crimes such as daytime burglary or shoplifting (Malcolm et al 2003). In the long run, children who had a habit of missing school will drop out from school before graduation and enter the labour market prematurely and become part of the less educated workforce which is a disadvantage from a economic view because most of them have lower earnings (National Center for Education Statistics 2002). Moreover, the school dropouts are more likely to become long term unemployed and obtain fewer opportunities in jobs. Some become homeless, and depend on welfare (Rothman 2001).

School absence caused by illness, besides the cost of treatment, is also a burden on caregivers who have to change from regular activities or miss work to care for the child (Hall et al 2003; Alberg et al 2003).

2.1.7 Causes of school absence

A review of the literature highlighted research from a number of different countries and revealed that there are various factors that lead to school absence. Some are individualised, and some are interrelated to other factors. These factors can be categorised broadly into: social factors; school related factors; individual factors, and health factors. In this review, only health factors will be discussed in detail.

2.1.7.1 Social factors

a) Home environment

Children from single or separated parent are more likely to be absent from school (Anderson et al 1983; Miller and Plant 1999; Gilliland et al 2003). Violence in the family such as parent arguments or fights increases the chance of missing school (Kernic et al 2002) as well as parent's over-consumptions of alcoholic beverages (Casas-Gil and Navarro-Guzman 2002). Overcrowded or substandard housing causse higher absenteeism in school because it leads to chronic health problems (Citizens Housing and Planning Council 2001).

b) Socioeconomic status

There are clear negative associations between the social economic status of parent and school attendance (Anderson et al 1983; Liang et al 2002; Jayachandran 2002; Zhang 2003). Rothman (2001) reported lower social economic class children had 20% higher rate of school absence than middle or upper social economic class children (Rothman 2001). Educational attainment of parent was found to have strong association with school attendance and was significant in predicting the number of school days missed (Cook et al 1985; Jayachandran 2002). Children whose parents have less than a high school education had the highest school absence rate (Office of the Assistant Secretary for Planning and Evaluation 2001).

c) Parents' attitude to education and to school absence

Parents' attitude to education may influence children's motivation to go to school. There are statistically significant differences of attitude to keeping children off school between parents whose children do not have school attendance problem and the parents of frequent absentees (Kinder et al 1995). Some parents do not care if their children miss school or even conspire with the children. Parents who think that attending school is not important may ask their children to help with

shopping or ask them to take care of ill relatives or to look after young siblings (Malcolm et al 2003).

d) Ethnic groups or minorities

Children from minority groups are more likely to be absent from school (Kornguth 1990). For example, in Australia the rate of school absence among indigenous children was 60% higher than the non-indigenous children (Rothman 2001). That higher rate of school absence is similar to Hispanic children in the US (Kahrananian et al 2005).

e) Social isolation

Children may sometimes feel lonely in school especially when they move to new schools and experience not fitting into new environment or it can happen if children have conflict with existing friends. These make them feel excluded from school (Kinder and Wilkin 1998; Malcolm et al 2003).

2.1.7.2 School related factors

a) Lessons

Content and delivery of the curriculum have a potential effect on children's schooling. If children think that the lesson is not useful to them or they dislike particular subjects, they can easily get bored and will not want to be in the class (O'Keefe 1993; Malcolm and Thorpe 1998; Malcolm et al 2003).

b) Teachers

In children's views, teachers and teaching staff have a great influence on their school attendance. Teacher's fairness and praise are crucial for children. Along

with big age-gap between teaching staff and children, personality incompatibility between teacher and children, an overload of assignments are all causes of unnecessary school absence (Kinder et al 1996; Malcolm et al 2003).

c) School location

School location has an impact on school attendance (Jayachandran 2002). There was a difference in school absence rate between sites of schools. Schools in big towns have higher absenteeism (Mora 1997; The Colorado Foundation for Families and Children 2002). However, Rothman (2001) reported country schools had 8.2 % higher absence rate than metropolitan schools (Rothman 2001).

d) Bullying

Fear of bullies is a persistent cause of absence, since some children may wish to avoid being bullied or getting hurt by not going to school (Kinder et al 1995; Kinder et al 1996; Kinder and Wilkin 1998; Edward and Malcolm 2002). Recent data from bullying statistics showed that 8% of students in United States missed one school day per month for fear of bullies (North Carolina Department of Juvenile Justice and Delinquency Prevention Center for the Prevention of School Violence 2005).

2.1.7.3 Individual factors

In some cases, a child may have individual problems such as laziness, low self-esteem, shame of personal features, such as being overweight, psychological dilemma, learning difficulties or behavioural problems (Klerman et al 1987a) or personality problem (Jones and Francis 1995) which may keep children off school. Several studies also found children who are active drug users have a low attendance rate (Alexander and Klassen 1988; Suss et al 1996; Lloyd C. 1998).

Teenagers worrying about their figures and whom have poor dietary practices also have a high rate of school absence (Brugman et al 1997). In addition, children with high rate of absenteeism often do not like school or and may have school refused problems such as school phobia (Granell et al 1984; Shimizu et al 1986; Nissen 2001).

2.2 Literature review on health related school absence

Health problems cause a significant amount of school absenteeism (Msall et al 2003). Millions of school-aged children in the US missed school for 1-11 days due to illness or injury over a 12 month period (Blackwell and Tonthat 2002; Dey and Bloom 2005). Data available from the Institute for Social Research on the percentage of 8th, 10th and 12th grade students missing 1, 2-5 and > 5 days of school a year showed that among 12th grade students one fifth of students has missed > 5 days a year; illness accounted for 34.2% of absences (Table 2.1).

Table 2.1: Percentage distributions of 8th, 10th and 12th grade students according to how many school days missed in 4 week period, and average percentage of total absences attributed to illness, 'skipping' school and other reason, 2000 (National Center for Education Statistics 2002)

Total days absent from school					Percentage of total absences attributed to each reason		
Grade	**0 day**	**1 day**	**2-5 days**	**> 5 days**	**Illness**	**Skipped school**	**Other reasons**
8	44.6	19.3	22.7	13.1	53.1	9.0	37.9
10	40.2	20.7	25.1	14.1	45.4	15.6	39.0
12	28.4	20.0	30.2	21.4	34.2	26.1	39.7

Common and acute physical illnesses, like headaches (Barea et al 1996), stomach-aches or other pains (McGrath 1999; Roth-Isigkeit et al 2005) or the common cold (Klerman et al 1987a) are frequent grounds for school absence. Whereas chronic or life threatening illness may have lower prevalence they nevertheless caused more missed school days than acute conditions (Larcombe et al 1990; Brook and Heim 1993; Boyle et al 1994; Vance and Eiser 2002). Many studies concluded that respiratory illness was the most common reason for absence from school among children (Fleming et al 1987; Cordell et al 1999; Nettleman et al 2001; Slack-Smith et al 2004).

The amount of days absent from school is correlated with many factors, such as the number of clinical visits, rate of activity limitation given by doctors, sex of child, and type of health conditions (Fowler et al 1985). In addition to severity of illness, the parents' attitude to school absence and parents' perceptions of their child's vulnerability to illness affected how much a child missed school (Sturge et al 1997; Glaab et al 2005).

In this review health related school absence will be discussed in four broad categories; chronic medical conditions, acute medical conditions, other medical illnesses, and accidents and injuries. Then school absence because of dental health conditions is discussed and compared with medical conditions.

2.2.1 Chronic medical conditions

Increased school absence rates is one of the common concerns of teachers about children who have chronic health conditions (McCarthy et al 1996). Their concerns are based on the fact that many children with chronic health conditions are chronic absentees (Thies and McAllister 2001). They have a higher school absence rate than their healthy peers. Findings from the National Health Interview Survey on Child Health in the United States 1988, revealed that among 7,465 young people age 10-17 years, people who had chronic conditions experienced on average 4.4 school absence days related to their chronic health conditions (Newacheck et al 1991). Other studies, which used smaller sample sizes, found great variations in the impact of chronic health conditions on school absenteeism. For example, in two studies, both carried out in the United States, whereas one in North Carolina reported a two fold difference of absence days (16 days to 7 days) between groups of chronically ill and healthy children (Fowler et al 1985). Whereas another study, in Massachusetts, showed smaller differences of 3 days (8.7 days to 5.8 days) (Weitzman et al 1986c).

Moving from the general view of chronic medical conditions to specific chronic medical conditions, there are certain chronic conditions that often cause school absences. They are; asthma, chronic or recurrent pain, dysmenorrhoea, and type I diabetes Mellitus. For example, Brook & Heim's list of chronic conditions which frequently caused school absence among Israeli students and the average absence days are shown in Table 2.2 (Brook and Heim 1993). However, these data are based on small numbers of children.

Table 2.2: Days of absence by chronic conditions

Pathology	Number of pupils	Percentage of total school population	Average absence days per year (SD)
Bronchial asthma	48	4.9	17.6 (14.9)
Inflammatory bowel disease	2	0.2	12.5 (8.6)
Convulsive disease	2	0.2	11.3 (5.7)
Kyphoscoliosis (severe) with back pains	7	0.7	10.8 (5.3)
Migraine (recurrent of chronic)	11	1.13	10.7 (5.8)
Arthritis	1	0.1	10.1 (6.4)
Recurrent abdominal pain	42	4.3	9.9 (7.9)
Diabetes mellitus	1	0.1	9.7 (5.1)
Sinusitis (recurrent or chronic)	5	0.5	9.4 (4.6)

Statistical significance $p < 0.01$, Source: (Brook and Heim 1993)

2.2.1.1 Asthma

Asthma is one of the most commonly reported youth illnesses, and the prevalence is increasing (Anderson et al 1994; Crockett et al 1995; Mannino et al 2002a; Butland et al 2006; Capriles et al 2006; Cho et al 2006). From evidence from across the world, asthma is one of the chronic respiratory illness most often causing time off from school (Bremberg and Kjellman 1985; Hill et al 1989; Diette et al 2000). Particularly in the United States, the impact of asthma on

children has been emphasized and widely researched. At a national level, the 1996 US Medical Expenditure Panel Surveys estimated that asthma accounted for 6.3 million days of school absence in the United States (Wang et al 2005). Moreover, a study of 1,665 aged 5-9 year old children in New York showed that 48% of the asthmatic group had school absences during the previous 1 month (Maier et al 1998). In another study, Silverstein et al (2001) after analysing school records of asthmatic school-aged children in Rochester, found that children with asthma had approximately two more days absences per year than non-asthmatic peers (8.95 days vs. 6.74 days) (Silverstein et al 2001), similar to the findings from the US National Health Interview Survey in 1988 of a 2.5 days difference (Fowler et al 1992).

Studies in countries other than the US also show the importance of asthma as a cause for increased school absenteeism. An annual health assessment in the Netherlands on 5,000 school children aged 4-15 years indicated that children with symptoms of asthma, 37% reported school absence for at least one week during the past 12 months, compared with 16% in children without respiratory symptoms (Spee-van-der-Wekke et al 1998). Likewise, asthma also accounted for 65.7% of primary school children in United Arab Emirates being absent for at least 1 day of school during one school year (Bener et al 1994). Asthmatic Saudi Arabian schoolboys experienced a larger total numbers of day missed compared to findings from other studies (13.6 days) (Al Dawood 2002).

2.2.1.2 Chronic or recurrent pain

Pain is also one of the health morbidities most experienced by children and young adolescents (McGrath et al 2000; Perquin et al 2000). Perquin et al (2000) indicated the most reported types of pain in children were limb pain, headache and abdominal pain, at prevalences of 23%, 22% and 22% respectively (Perquin et al 2000). Another finding was that headache, abdominal pain and musculoskeletal pain accounted for most of the recurrent pain among children and adolescents

(Goodman and McGrath 1991). Recurrent pain is significantly related to excess school absenteeism. Some children with severe chronic pain could be absent from full time education. A report from a study on interdisciplinary cognitive behavioural treatment for adolescents with chronic pain in Bath, United Kingdom, stated the mean absence from school among participants in the treatment group was as high as 17 months (Eccleston et al 2003). However short duration school absences are also documented and commonly found. For instance, figures from a study using parent checklists on psychosocial problems caused by 6-15 year old children with recurrent pain, 41% of 15,492 parents reported that their children were often absent from school whereas 14% reported absence sometimes or never (Campo et al 2002).

In one intensive study on the 3-month prevalence of chronic pain in children by Roth-Isigkeit et al (2005) where chronic pain was defined according to McGrath's definition; "any prolonged pain that lasts a minimum of 3 months or any pain that recurs throughout a minimum period of 3 months" (McGrath 1999) (pp 81), the prevalence of each type of pain was; headache (60.5%), abdominal pain (43.3%), limb pain (33.6%) and back pain (30.2%). The pain had a major impact with almost 50% of children reporting school absence caused by pain. The prevalence of people who were absent from school because of headache, limb pain, abdominal pain and back pain were 43%, 35%, 51.1% and 19.4% respectively (Roth-Isigkeit et al 2005). Because of the frequency of pain in children, the main types of pain will be reviewed separately.

a) Headache

Headache is a common complaint in paediatric practices (Abu-Arefeh and Russell 1994). Several types of headache are found in children such as migraine, chronic daily headache, episodic tension-type headache and chronic tension type headache (Linet et al 1989; Kong et al 2001; Zwart et al 2004). However, in this review, general headache and migraine are discussed in detail due to their high prevalence in causing school absenteeism. The prevalence of headache across the world

among young children and adolescents aged between 3-18 years old varies from 3.7% to 85% and prevalence of migraine is 3% to 14% according to age and sex (Mortimer et al 1992; Raieli et al 1995; Barea et al 1996; Carlsson 1996; Sillanpaa and Anttila 1996; Al Jumah et al 2002; Shivpuri et al 2003; Bugdayci et al 2005).

For headache in general the burden on children's lives are diverse (Carlsson et al 1996). Frequently, children can have a headache severe enough to interfere with routine activities such as being unable to attend class or absent them from the whole school day. Data from many studies carried out by different approaches and duration show that the number of school days missed or percentage of school absence caused by headache varied considerably. Using a prospective class registration, Collin et al (1985) found that only 3.7% of 5-14 year old students reported school absence related to headache, in two 12-week periods (Collin et al 1985). From a population-based telephone survey, Linet et al (1989) showed that 7.9% of males and 13.9% of females aged 12-29 years old in one county in Maryland, US reported absence from school or work because of headache (Linet et al 1989). A 2-years cross sectional study in Qatar, indicated that, 85% of children aged 6-17 years experienced headache and of those who had headache, 80.1% said it affected schooling because headache episodes caused frequent school absences (Bessisso et al 2005). A study in the Netherlands compared prevalence of school absence by headache severity. School absence in the past year due to headache was 64%, 48% and 19% among the children in the high, medium and low headache severity groups, respectively (Bandell-Hoekstra et al 2001).

b) Migraine headache

Migraine headache is the most common cause of recurrent headache in children and young adolescents and considerably reduces school attendance (Abu-Arefeh and Russell 1994). The prevalence of migraine has been documented in a number of studies and with significant variation. Lipton et al (2001) estimated that in 2001

there were 14.8 million Americans who suffered from migraine that lead to harsh impairment in normal daily activities or required bed rest (Lipton et al 2001). In school-aged populations, migraine has been documented as being the cause of school absenteeism by several authors. North American children who had migraine reported frequent school absence (Stang and Osterhaus 1993). Furthermore, a national level self-administered questionnaire household survey indicated that migraine affected 31% of 29,727 Americans aged 12 years old and they missed at least 1 day of work or school in the past three months (Lipton et al 2001). In the United Kingdom, a population based study of 2,165 schoolchildren in Aberdeen aged 5-15 years, found that 10.6% of children experienced migraine headache and subsequently lost 2.8 days of schooling per year due to migraine which is approximately one-third of the average of total school absence from all illnesses (Abu-Arefeh and Russell 1994). In Taiwan, students with migraine were more likely to miss school because of their headaches than those without migraine headaches (30% vs. 14%, odds ratio 2.7) (Lu et al 2000).

c) Low back pain

Low back pain is a common complaint in childhood (Szpalski et al 2002; Roth-Isigkeit et al 2005). Low back pain in school-aged children is often related to schoolbag weight (Jones et al 2003) and sitting position (Cardon et al 2004; Murphy et al 2004). Although there are studies about back pain on children and some mentioned its' effects on school activities or school attendance (Salminen et al 1992; Szpalski et al 2002), the school absence time resulting from this somatic complaint has been rarely documented. A study among 749 boys and girls in primary and secondary schools in Germany of the effects of pain found that 19.4% with back pain reported having been absent from school because of pain (Roth-Isigkeit et al 2005).

d) General recurrent abdominal pain

Recurrent abdominal pain can affect children's daily activities. Roth-Isigkeit et al (2005) found that slightly more than half of children and adolescents in Germany who had abdominal pain were absent from school (Roth-Isigkeit et al 2005). Mother's report on a five-year follow up study of young people age 6-18 years old with recurrent abdominal pain (RAP), in Tennessee, US, indicated that the average school absence due to abdominal symptoms in the previous year was 3.46 days whereas control groups missed school for 1.27 days from abdominal symptoms (Walker et al 1998). In Kuala Langat, Malaysia, a community survey conducted on schoolchildren aged 9-15 years old considered to have recurrent abdominal pain found that during the past 3 months, 49% missed school because of abdominal pain (Boey and Goh 2001).

e) Dysmenorrhoea

Painful menstruation without pelvic abnormality or primary dysmenorrhoea is one specific pain which is common among adolescent girls. Klein & Litt (1981) reported the overall prevalence of dysmenorrhoea among 2,700 American females between the ages of 12 and17 years was 59.7 % (Klein and Litt 1981). In a Swedish study, 72% of the total population of 19 year-old women reported dysmenorrhoea and more than one-third of them reported disruption of daily activity during painful episodes (Andersch and Milsom 1982). Fifty-two percent of 11^{th} and 12^{th} grade schoolchildren in Perth, Australia, had limitation of daily activities such as sports, social and schooling from dysmenorrhoea (Hillen et al 1999). Vicdan et al (1996) believed that school absenteeism is the most significant indicator of severity and morbidity of dysmenorrhoea (Vicdan et al 1996). In the US, dysmenorrhoea is the leading cause of activity non-participation and short-term school absenteeism (Klein and Litt 1981; Johnson 1988; Banikarim et al 2000; Davis and Westhoff 2001). Similar findings were reported in other parts of the world. 22% of female Croatian schoolchildren missed school from dysmenorrhoea (Strinic et al 2003). In a sample of Swedish school girls aged 14-

19 years, 10% reported school absence because of dysmenorrhoea episodes (Svanberg and Ulmsten 1981). Wadhwa (2004) stated that dysmenorrhoea caused 23% of young Indian adolescents to miss school (Wadhwa et al 2004). In Iran, 19% of 200 students admitted that painful menstrual periods made them miss school (Poureslami and Osati-Ashtiani 2005). Lastly, a study on the impact of dysmenorrhoea on academic activities in 16-19 year old Thai students revealed that 21.1% of dymenorrhoeic students experienced school absence during the painful episodes (Tangchai et al 2004).

f) Other chronic pains

The association between other chronic or recurrent pains and school absence have been explored to a lesser extent, although there are data on pain prevalence. Frequent absence from school was also identified among children with some other pains. A 1-year follow up study in 1,756 Finnish schoolchildren (aged 9-12 years) found that 43.2% (n=57) of children with widespread musculoskeletal pain had missed school to stay at home because of pain (Mikkelsson et al 1997).

Moreover, there are some induced pains from systemic diseases that had been observed to have association with limited school activities. Stoff, Bacon and White (1997) found a negative association of rheumatic disease and school achievement and also school attendance (Stoff et al 1989). Children with arthritis symptoms had lower rates of attendance (Sturge et al 1997). Data from 10-month home pain diaries from 18 sickle cell patients aged 8-17 years old revealed that sickle cell-related pain affected school attendance and sleeping. This resulted in 21% of 3,186 school days absent, and half of the absenteeism occurred on the day that children had pain. Of the pain-associated absenteeism, two-thirds occurred when pain was managed at home. The average consecutive number of school days missed was 2.7 (Shapiro et al 1995).

2.2.1.3 Type 1 diabetes mellitus

Type 1 diabetes mellitus is another chronic medical condition, which increases school absence. It is not only that it is one of the most common chronic morbidities of childhood but also, Type 1 diabetic children and their families have immense burdens on handling complicated routine lives to control the disease, which may make them vulnerable to increased school absenteeism (Ryan et al 1985; Glatthaar et al 1988; McCarthy et al 2002). McCarthy et al (2002) found Type 1 diabetes did not lower academic performance of diabetic children when compared with healthy siblings or classmates. However, children with diabetes had a significantly higher annual average school days missed than their siblings (7.3 to 5.3) (McCarthy et al 2002). Likewise there was other study in Toronto, Canada, which compared Type 1 diabetes mellitus children with either their non-diabetic siblings or peers. The diabetic children missed more school days, a mean of 10.9 days, their siblings missed 8.1 days and peers missed only 5.5 days (Glaab et al 2005). Similarly, Vetiska et al (2000) reported high disparity of school absence days between diabetic children and siblings (11.4±10.9 vs. 5.3±5.8) (Vetiska et al 2000).

2.2.2 Acute medical conditions

Acute sicknesses may cause less school absenteeism than chronic sickness. However they result in more severe and sudden school absences and restrictions on daily activities. A national survey on young English residents aged 2-24 years, found that acute sickness in the past two weeks and the number of days of limited activities varied by sex and age of informants; 13% of 2-15 year old males had acute sickness over the proceeding 2 weeks with 4.9 days of restricted activities. Among older males (16-24 years old) the prevalence was lower (11%) but the number of restricted day was higher (6.2). Figures for females aged 2-15 years were similar to their male counterparts (13%, 4.8 days). The prevalence of acute

sickness among females aged 16-24 years old was higher (15%), but the number of restricted days was about the same as for males (Boreham and Prior 1999). Likewise, in the US National Health Interview Survey in 1994 they estimated the rate of 220.1 yearly acute conditions per 100 children aged 5-17 year. It resulted in 632.6 restricted activity days per 100 persons (Adams and Marano 1995). A list of number of restricted-activity days associated with acute conditions per 100 person per year from the United States National Health Interview Survey in 1994 is shown in Table 2.3.

Table 2.3: Acute conditions and number of restricted-activity days associated with the conditions

Type of acute condition	Number of restricted-activity days per 100 persons per year
All acute conditions	632.6
Infective and parasitic diseases	136.2
- Common childhood disease	32.6
- Intestinal virus, unspecified	18.3
- Viral infections, unspecified	29.7
- Other	55.6
Respiratory conditions	284.1
- Common cold	62.3
- Other acute upper respiratory	42.9
- Influenza	134.4
- Acute bronchitis	27.7
- Pneumonia	11.4
- Other respiratory conditions	5.4
Digestive system conditions	18.5
- Dental conditions	3.3
- Indigestion, nausea, and vomiting	9.3
- Other digestive conditions	5.9
Injuries	100.7
- Fractures and dislocations	47.4
- Sprains and strains	17.4
- Open wounds and lacerations	14.0
- Contusions and superficial injuries	10.9
- Other current injuries	11.0
Selected other acute conditions	71.5
- Eye conditions	0.3
- Acute ear infections	24.1
- Other ear conditions	2.3
- Acute urinary conditions	3.2
- Disorders of menstruation	2.4
- other disorders of female genital tract	2.5
- Delivery and other conditions of	17.6
- Skin conditions	2.3
- Acute musculoskeletal conditions	4.2
- Headache, excluding migraine	5.7
- Fever, unspecified	6.9
All other acute conditions	21.6

Source: (Adams and Marano 1995)

2.2.2.1 Non-asthma respiratory illness

Particular acute medical conditions that cause school children taking time of school include non-asthma respiratory illnesses. These respiratory illnesses are the cause of school absence among school children that most frequently found (Nettleman et al 2001). For example, in the US International Health Survey in 1994 reported upper respiratory tract infections alone account for 170 million days of restricted activity, 23 million days of school absence, and 18 million days of work absence (Benson and Marano 1994). Doull et al (1996) conducted a parent questionnaire survey in the United Kingdom on the effects of respiratory symptoms particularly wheeze and cough on school absenteeism over a twelve month period. Among 4,830 children aged 7-9 years old in Southampton, 348 (7.2%) children had missed more than 5 days of schooling in the previous year for respiratory symptoms, while 43 children (0.9%) had missed more than 20 days of schooling during the previous year (Doull et al 1996). Similarly, in another UK study, wheezing illness accounted for 58% of school absence in a cohort of 9 years old schoolchildren in London (Anderson et al 1983). Comparable results were reported in an American study; 69% of children were absent from school for an average of 2.54 days missed per child (Nettleman et al 2001). Van Staaij et al (2005) reviewed thirteen worldwide studies on sore throat episodes and associated school absenteeism. The outcome estimated sore throat episode was 1.2 episodes per year and sore throat associated school absence was 2.8 days per person per year (van Staaij et al 2005).

Viral infectious respiratory illnesses are also prevalent in children as they are more likely to be transmitted when sharing the same environments, like schools. Common cold causes 189 million school missed days each year (Hagen 2003). The primary source of influenza spread is children (Poland and Hall 1999), and influenza has been found to cause excessive school absence (Sessa et al 2001; Principi et al 2004). For instance, 100 children missed 63 school days during 37 days of the flu season (Neuzil et al 2002). A cohort study in Finland on the burden of influenza in 2,231 outpatient children younger than 13 years old with influenza

was conducted for two consecutive influenza seasons from 2000-2002. On average 75.2% of children had missed day care or school days for at least 1 day. For every 100 ill children, there were 274 days missed among children younger than 3 years old, 262 days among children aged between 3-6 years, and 216 days among older children. Furthermore, the average duration of absence in each group was 3.6, and 2.8 days, respectively (Heikkinen et al 2004). While, Principi et al (2004) reported 352 children less than 14 years of age with diagnosed influenza had average school absence days in a 6 months period of 5.10 days (±2.55) in comparison with 4.25 (±2.93) in healthy children (Principi et al 2004).

a) Acute otitis media

Furthermore, a negative association between acute otitis media and school absenteeism has been observed. Data from parents diaries of 285 children aged 6 months to 10 years old who suffered from acute otitis media showed average number of school day missed per episode was 1-3 days (Little et al 2001). In Israel, a study on the burden of acute otitis media in younger children aged 6 months to 2 years, indicated the duration of child care absenteeism among 150 children with otitis media was 3.5 days (±2.5) whereas the control group were absent for just under a day (0.9 day) (Greenberg et al 2003). Taking care of sick children also interferes with parental activities. McCormick et al (2005) measured how much parents missed work or college. Among 219 parents of children with acute otitis media, 24 (11%) of parents reported missing work or college (McCormick et al 2005).

b) Pneumonia

In Israel, childhood community-acquired pneumonia infections were found to have an impact on children's quality of life among three groups of children (n=213) admitted to different sites in a single hospital; the paediatric wards, paediatric emergency department and a primary health clinic. In addition, data from telephone interviews carried out 21 days after discharge indicated mean

duration of missed school days due to pneumonia was 7.5±5.6, 4.4±4.1 and 3.7±3.3, respectively. While children in control groups had only 0.5±1.4 days of school missed (Shoham et al 2005).

2.2.2.2 Acute headache

Acute headache has been mentioned as a common reason for school absence as well as chronic pain or aches. Headache is a common morbidity among schoolchildren (Passchier and Orlebeke 1985; Barea et al 1996; McGrath et al 2000). McGrath et al (2000) found acute headache was the most prevalent pain experienced by children; 58.3% suffered from it (McGrath et al 2000). Moreover, acute headache was also positively correlated with high rate of absence from school among Swedish children (Egermark-Eriksson 1982).

2.2.3 Parasite borne illness

In developing countries, parasitic infections such as the intestinal worm infections or the mosquitoe borne diseases are major health problems and common reasons for school absence of children from rural areas to be absent from school (Chippaux and Larsson 1991; Saathoff et al 2004).

Worm infected children were absent from school more often than their uninfected peers (Nokes and Bundy 1993; de Clercq et al 1998). For instance, among 1,459 primary schoolchildren in Nigeria, 21% were infected with guinea worm disease and this infection caused infected children to lose 10 times more school days a year than non-guinea worm-infected children (25% vs. 2.5%) (Ilegbodu et al 1986; de Clercq et al 1998).

Malaria is still a serious and increasing public health problem in some areas (Fernando et al 2003; Maguire et al 2005; Mueller et al 2005). The burden of malaria on school performance has been studied and its negative effect on school absenteeism has been noted. Among the general population in rural areas in Sri Lanka, malaria infection during the high transmission season made schoolchildren lose 10% of school days (Konradsen et al 1997). Another study also carried out in African children and a community study on the economic impact of malaria on education investment found 2,886 cases of malaria in primary schoolchildren aged 7-13 years. Within this group, average school absenteeism was 5.3 days and malaria caused a total of 11,028 school days to be lost (Kere et al 1993).

2.2.4 Miscellaneous health conditions

There are some other health morbidities that have low incidence in school-aged children but can also cause school absenteeism. However, there are only a few studies documenting the relationship between those morbidities and school absenteeism. Ogunfowora (2005), compared school days lost between sickle cell anemia children and healthy siblings; it was 9.3 day and 4.3 days per school year (Ogunfowora et al 2005). In Canada, an episode of chicken pox caused an average of 4.2 days school lost in children aged 5-9 years (Law et al 1999).

2.2.5 Accidents and injuries:

2.2.5.1 Accidents

The Health Survey for young people in England collected information on accidents from 1995 to 1997 for children aged 2-15 years and estimated annual accident rates per 100 persons for major accidents at 31 per 100 for boys aged 2-15 years and annual minor accident rates per 100 persons were estimated to be

216 per 100 children. The figures for girls aged 2-15 years were 22 per 100, and 144 per 100 for major and minor accidents respectively. Data also indicated that major accidents accounted for a considerable amount of time taken off work or school (Table 2.4) (Purdon 1999).

Table 2.4: Percentage of time taken off work or school by children aged 2-15 years old because of major accidents

Time taken off work/school	Male	Female
Less than 1 day	59	55
One day to less than one week	25	18
One week to less than one month	11	19
1-2 months	2	6
3 or more months	3	1

Source: (Purdon 1999).

2.2.5.2 Injuries

Childhood injuries cause ill health and disability. Some researchers interested in the association between school absence and injuries found that 16.1% American adolescents aged 10-17 years experienced accidents, injuries and poisonings which resulted in 4.1 mean number of school absent days (Fraser, Jr. 1996). However, for injuries alone, the US National Health Interview Survey in 1994 estimated restricted activity days caused by injuries was 100.7 days per 100 persons age 10-17 years (Adams and Marano 1995). A case-control study in two Welsh counties, UK on 364 paired children age 4-16 years who had minor injuries, pointed out that case children significantly attended less school than control children by comparing the number of half day school attendances recorded for one week following the injuries (7.38 vs. 9.40 $p<0.001$). Moreover, the lowest half days attendance of 6.0 was recorded among burn/scald injuries (Barnes et al 2001). In Denmark 28% of 4,046 students were injured and 16% of injured students missed at least one full day of school (Holstein and Due 1999).

There are some studies on specific type of injuries such as sports related injuries. For instance, Sorenson et al (1998) did a study on socioeconomic effects from sport injuries in Danish schoolchildren aged 6-17 years. Results showed incidence rate of sport injuries was 74 per 1,000 per year. And 37.2 % of 1,320 participants had been absent from school due to the injuries for an average of 1.2 days (Sorensen et al 1998). In Ireland, of 86 secondary school children (11-18years) who presented in the accident and emergency department with sports injuries, 21.3 % missed part of a day, 10.7% a full day, 9.3% parts or more than one day,17.3% missed more than two days of school (Abernethy and MacAuley 2003).

The summaries of the studies that investigated school time loss among children caused by chronic health conditions, chronic pain, dysmenorrhea, non-asthma respiratory illnesses, injuries and other medical conditions are shown in Table 2.5 to Table 2.9 respectively.

Table 2.5: School absence caused by chronic health conditions among school-aged children

Health conditions	Author	Average number of day or percentage of school time absent from condition	Average school absent days per child with condition from all reasons	Period	Absenteeism rate of children without condition for all reasons	Study type	Age (years)	Sample size	Population/Geographic
Chronic conditions	(Newacheck et al 1991)	4.4 days/-	n/a	1 year	n/a	Interview	10-17	7,465	US (NHIS 1988 database)
	(Weitzman et al 1986c)	n/a	8.5	1 year	5.8	Parents' reports	6-17	573	US Children in clinics
Asthma	(Silverstein et al 2001)	8.95±7.95 days/-	n/a	6.6 years	6.74±7.08	cohort (case-control)	Primary to high school age	Case=92	Minnesota, US. school
	(Wang et al 2005)	2.48 days/-	n/a	1 year	n/a	-	5-17	2.52 million	US 1996 Medical Expenditure Panel Survey
	(Hill et al 1989)	-/7%	n/a	1year	n/a	Questionnaire survey	n/a	3,805	US school
	(Fowler et al 1992)	n/a	7.6 days	1 year	2.5 days	Interview	Grade 1-12	10,362	US (NHIS 1988 database)
	(Maier et al 1998)	-/48%	n/a	1 year		Parents' reports	5-9	192 asthmatic children	Seattle, US, school

Table 2.5: School absence caused by chronic health conditions among school-aged children (continued)

Health conditions	Author	Average number of day or percentage of school time absent from condition	Average school absent days per child with condition from all reasons	Period	Absenteeism rate of children without condition for all reasons	Study type	Age (years)	Sample size	Population/Geographic
Asthma	(Al Dawood 2002)	n/a	13.6±3.4	1 year	3.7±2.2	Case-control, Parent self-administered questionnaire	6-15	Case=141 Control= 1,341	Saudi Arabia, school
Type 1 Diabetes Mellitus	(McCarthy et al 2002)	n/a	7.3	1 year	5.3	Case-control	14.8±3.2	DM=244 Non Dm siblings= 110	Iowa, US children from paediatric diabetes clinics
	(Vetiska et al 2000)	-/-	11.4±10.9	1 year	5.3±5.8	Telephone interview	School age	DM=56 Non Dm siblings=56	Toronto, Canada, diabetes clinic
	(Glaab et al 2005)	-/-	8.8 (median)	1 year	control=5.5 (median) non DM siblings =8.19 (mean)	Case-control	6-13	DM=78 non DM siblings= 38 control=11 8,269	Canada, diabetes clinic, school

Table 2.6: School absence caused by chronic pains among school-aged children

Health conditions	Author	Average number of day or percentage of school time absent from condition	Average school absent days per child with condition from all reasons	Period	Absenteeism rate of children without condition for all reasons	Study type	Age (years)	Sample size	Population/Geographic
Headache	(Roth-Isigkeit et al 2005)	98 (13.08)	n/a	3 months	n/a	Cross-sectional	4-18	749	Germany, school
	(Bandell-Hoekstra et al 2001)	-/41%	n/a	1 year	n/a	Self-administered questionnaire	10-17	2,358	Netherlands, school
	(Linet et al 1989)	Male-/7.9% female-/13.9%	≥1	1 month	n/a	Telephone interview	12-29	10,169	Maryland, US, general population
	(Bessisso et al 2005)	-/80.1%	n/a	2 years	n/a	Self-administered questionnaire	6-17	723	Qatar, school
Migraine	(Abu-Arefeh and Russell 1994)	2.8 days/-	7.8	1 year	3.7	Parents self-administered questionnaire and children interview	5-15	2,156	Aberdeen UK, school
	(Lipton et al 2001)	-/31%	≥1	3 months	n/a	Self-administered questionnaire	≥12	29,727	New York, US, household
	(Lu et al 2000)	-/30%	1to >14	1 semester	14%	Self-administered questionnaire	13-15	4,064	Taiwan, school

Table 2.6: School absence caused by chronic pain among school-aged children (continued)

Health conditions	Author	Average number of day or percentage of school time absent from condition	Average school absent days per child with condition from all reasons	Period	Absenteeism rate of children without condition for all reasons	Study type	Age (years)	Sample size	Population/Geographic
Back pain	(Roth-Isigkeit et al 2005)	-/1.73%	n/a	3 months	n/a	Parent and children self-administered	4-18	749	Germany, school
	(Jones et al 2004)	-/26.2%	n/a	lifetime	n/a	questionnaire	10-16	500	UK, school
Limb pain	(Roth-Isigkeit et al 2005)	-/3.73%	n/a	3 months	n/a	Parent and children self-administered questionnaire	4-18	749	Germany, school
Abdominal pain	(Walker et al 1998)	3.46±6.96/-	n/a	1 year	n/a	Telephone interview	6-18	76	Tennessee US, Paediatric clinic
	(Boey and Goh 2001)	-/49.06%	n/a	3 months	n/a	Children interview	9-15	161	Malaysia, school children with recurrent abdominal pain

Table 2.7: School absence caused by dysmenorrhoea among school-aged children

Health conditions	Author	Average number of day or percentage of school time absent from condition	Average school absent days per child from all reasons	Period	Absenteeism rate of children without condition for all reasons	Study type	Age (years)	Sample size	Population/Geographic
Dysmenorr -hoea	Roth-Isigkeit et al 2005	-/6.27%	n/a	3 months	n/a	Parent and children self-administered questionnaire	4-18	749	Germany, school
	(Widholm 1979)	-/23.4%	n/a	n/a	n/a	n/a	13-20	331	Scandinavia Children from the population
	(Johnson 1988)	-/45.6%	n/a	n/a	n/a	self-administered questionnaire	14-18	182	US
	(Vicdan et al 1996)	-/25.6%	n/a	During menstruatio n period	n/a	self-administered questionnaire	13-18	10,688	Turkey, school
	(Klein and Litt 1981)	-/14%	n/a	n/a	n/a	Health examination	12-17	1,611	US, National Health Examination Survey
	(Banikarim et al 2000)	33% miss some classes, 38% missed days	Half day to >4	3 months	n/a	self-administered questionnaire	15-17	706	Texas, US, Hispanic schoolchildren

Table 2.7: School absence caused by dysmenorrhoea among school-aged children (continued)

Health conditions	Author	Average number of day or percentage of school time absent from condition	Average school absent days per child from all reasons	Period	Absenteeism rate of children without condition for all reasons	Study type	Age (years)	Sample size	Population/Geographic
Dysmenorr -hoea	(Poureslami and Osati-Ashtiani 2005)	-/15%	1-7	1 year	n/a	self-administered questionnaire	15-18	250	Iran, school
	(Tangchai et al 2004)	-/21.1%	n/a	Life time	n/a	self-administered questionnaire	16-19	664 women with dysmenorrhoea	Thailand, school
	(Wadhwa et al 2004)	-/23%	n/a	1 year	18.7%	self-administered questionnaire	13-23	74 children with pain 126 children with no chronic pelvic pain	India , school

Table 2.8: School absence caused by non-asthma respiratory illnesses among school-aged children

Health conditions	Author	Average number of day or percentage of school time absent from condition	Average school absent days per child from all reasons	Period	Absenteeism rate of children without condition for all reasons	Study type	Age (years)	Sample size	Population/Geographic
Respiratory illness	(Nettleman et al 2001)	-/69%	2.84	5 months	n/a	Parent and children questionnaire	5-11	954	US
Influenza	(Heikkinen et al 2004)	-/75.2%	≥1	2 years	n/a	Parents diary	0-13	2,231	Finland, day care and school
	(Principi et al 2004)	-/-	5.10±2.55	6 months (25week)	4.25±2.93	Clinical observation	<14	352 Influenza case 3,419 non-influenza case	Italy, paediatrics clinics
Pneumonia	(Shoham et al 2005)	n/a	7.5±5.6[1] 4.4±4.1[2] 3.7±3.3[3]	29days	0.5±1.4	Cross-sectional;	< 3	213 pneumonia case 99=control case	Israel, paediatrics wards[1], paediatric emergency department[2], primary health clinic[3]
Sore throat	(van Staaij et al 2005)	n/a	2.8	1 year	n/a	Systematic review	<18	n/a	13 International published studies

Table 2.8: School absence caused by non-asthma respiratory illnesses among school-aged children (continued)

Health conditions	Author	Average number of day or percentage of school time absent from condition	Average school absent days per child from all reasons	Period	Absenteeism rate of children without condition for all reasons	Study type	Age (years)	Sample size	Population/Geographic
Acute otitis media	(Greenberg et al 2003)	n/a	3.5±2.5	1 months	0.9±2.7	Questionnaire and telephone interview	6 months–2 years	Case=150 Control=51	Israel (AOM children in general practices)
	(Little et al 2001)	n/a	1-3	n/a	n/a	Daily diary and questionnaire	6 months-10 years	285	England (AOM children in general practices)
	(McCormick et al 2005)	-/11%	n/a	30 days	n/a	Parents questionnaire	6 months-12 years	219 children with otitis media	Texas, paediatric clinic

Table 2.9: School absence caused by injuries and other medical conditions among school-aged children

Health conditions	Author	Average number of day or percentage of school time absent from condition	Average school absent days per child from all reasons	Period	Absenteeism rate of children without condition for all reasons	Study type	Age (years)	Sample size	Population/Geographic
Injuries	(Holstein and Due 1999)	≥1 day/16%	n/a	1 year	n/a	Self report	11-15	4,046	Denmark ,school children
	(Fraser, Jr. 1996)	4.1days/-	n/a	1year	n/a	Household Interview	10-17	7,470	US (NHIS 1988 database)
	(Sorensen et al 1998)	-/37.2%	1.2	Beginning of injury to recovery	n/a	Self administrated questionnaire	6-17	1,320 sports related injured children	Denmark, school
Malaria	(Kere et al 1993)	5.3days/-	n/a	1 year	n/a	Observation	7-13	2,886 children with malaria	Solomon Island, school
Sickle cell disease (pain)	(Shapiro et al 1995)	6-8 weeks (2.7 consecutive days /-	n/a	1 year	n/a	Home diary	8-17	18 children with Sickle Cell disease	US, children, Sickle Cell Centre
Sickle cell anemia	(Ogunfowora et al 2005)	n/a	9.3±5.5	1 year	4.3±2.6	questionnaire	6-17	Case=52 Siblings=62	Nigeria,
Chicken pox	(Law et al 1999)	4.2±2.6 days/-	n/a	1 episode	n/a	Care givers interview	5-9	87 children with chicken pox	Canada, school

2.3 Literature review on dentally related school absence

Absence from school due to dental conditions and dental care was expected to be related to levels of dental disease and socioeconomic factors. Therefore a brief review is presented of the prevalence of dental conditions which includes dental caries and dental pain. Next, the frequency of factors that influenced dental care or dental visits will be discussed as they relate to school absences. Then the justification of why school absence due to dental conditions and dental care should be considered as a practical markers when measuring socio-dental impact of dental problems on schoolchildren will be reviewed.

2.3.1 Prevalence of dental conditions and dental care

In this study, the two dental conditions reviewed are dental caries and dental pain as they both are the main reasons for children attending for dental care. Dental visits are considered as dental care in this study.

2.3.1.1 Dental Caries

Dental caries is the most prevalent disease among children (Weyant et al 2004; Donahue et al 2005). Although the rates of dental caries in developed countries have dramatically declined (Jamieson et al 2004), they are still high among children from minority groups or socially deprived children (Weidler 2000). Most worryingly, caries is still highly prevalent in developing countries, and in some countries, caries rates are increasing (Petersen 2003).

Data from WHO, Oral Health Country/Area Programme (CAPP) provides an insight into the global caries situation. The Global weighted mean DMFT value for 12 year old children was 2.2 which is within the 'low level' (DMFT=2.7-4.4)

according to the WHO classification. Sixty eight percent of countries (126) had a mean DMFT of 3 or less. The 126 countries represent 48% of the Worlds' population. The remainder have caries levels above a mean DMFT of 3. The data excludes China and India, the two most populated countries, because of their heavy impact on the weighted global values (WHO 2005).

Despite the global caries situation indicating low levels of caries, data from numerous studies shows that dental caries is still highly prevalent (Nomura et al 2004). In Thailand, data from the most recent National Oral Survey in 2001 reported that even though the DMFT score of 1.6 for 12 year old children was low, caries prevalence had increased from 45% in 1984 to 57% in 2000 (Headquarters of Dental Public Health 2002). More recent data from a study among 11-12 year old children in Suphanburi province, Thailand reported mean DMFT scores of 1.5 (±1.8) with 56.9% caries prevalence. The study found a high D component and, much of the caries was untreated. Therefore toothache and a need for care was considerable, and should be one of health problems to be concerned about in Thailand (Gherunpong et al 2004b).

2.3.1.2 Dental Pain

A large number of children worldwide do not receive restorative dental treatment or only attend dentists for symptomatic visits. (Rajab et al 2002; Petersen 2003; Skaret et al 2004; Petersen et al 2005). For example, 22% of American children aged 6-17 years in 1999 and 2000 had untreated dental caries (Centers for Disease Control and Prevention 2004). Yee and Sheiham (2002) reviewed the dental literature for the last ten years and summarised the global percentage of untreated caries among 12 year old children according to the GDP of the nations. The untreated caries for the low income African nations was 87% and for the low income Asian nations 90%. For middle income nations and high income nation

the percentage of untreated caries was 71% and 22% respectively (Yee and Sheiham 2002).

Based on the high prevalence of untreated caries in children and the fact that untreated dental caries can lead to toothache it is not surprising that those recent studies reported a high prevalence of dental pain among school-aged children. Several studies have shown that dental pain is common in children (Whittle and Whittle 1995; Evans et al 1996; Shepherd et al 1999; Naidoo et al 2001; Slade 2001; Vargas et al 2002; Milsom et al 2002). One study on the severity of dental pain among children aged 8 years in Harrow, England showed that in the past 4 weeks, 47.5% of children experienced dental pain (Shepherd et al 1999). Goes (2001) reported that 33.6% of Brazilian schoolchildren aged 14-15 years had toothache in the last six months and 8.2% had pain of greater severity. The majority (88%) of 8-10 year old children in Western Cape, South Africa had experienced dental pain in their lifetime (Naidoo et al 2001). Likewise, in Sri Lanka, lifetime prevalence of oral pain was 49% in children aged 8 years old (Ratnayake and Ekanayake 2005). The high prevalence of untreated caries and dental pain may affect school attendance.

2.3.1.3 Dental visits

Besides the fact that untreated dental caries can lead to dental pain and cause school absenteeism, having dental visits during school time can also cause substantial school loss. The longer children spend attending dentists, the more time children miss school hours as most attend dentists during school time. The prevalence of school-aged children taking school time off for visiting dentists is high enough for schools in the US to mention '*dental visit or dental appointment*' in the school regulation handbook as a reason to be considered as a health-related school absence (Blackwell and Tonthat 2002).

There are a few reports on the number of dental visits per year by children in different countries. In Scotland, a longitudinal study recorded the number of dental visits of 1,340 children aged 5, 8, 12 and 15 years. Data collected for 5 years showed that attendants visited dental clinics once per year on average. In addition, the highest number of visits per year was 20 (Pitts 1991). Similarly the US National Report of 2002 indicated that 74.3% of children aged 2-17 years had at least one dental visit per year (Centers for Disease Control and Prevention 2004). Vargas and Ronzio (2002) analysed data on 2-18 year old children from the Third National Health and Nutrition Examination Survey (NHANES III) conducted from 1988-1994. Among the sample of 5,170 6-18 year old children, 77% had made dental visits in the previous year (Vargas and Ronzio 2002).

The frequency and patterns of dental visits among children varies considerably and is affected by many factors, such as socioeconomic status of parents, need of treatment, type of treatment, dental care policy by government, accessibility and availability of dental services and type of dental insurance. A study on immigrant mothers of low income families regarding their child's dental visit revealed that regular dental visits were significantly associated with household income, provider availability on weekends, and insurance coverage (Kim and Telleen 2004). Studies are consistent that higher household income is a determinant of dental visits for children (Mouradian et al 2000; Macek et al 2001; Yu et al 2001; Kim 2005), as is education of parents (Yu et al 2001; Rajab et al 2002). Ethnicity was also related to regularity of dental visits. Non-Hispanic White children reported having regular dental visits (Vargas and Ronzio 2002). Mothers who had positive attitudes towards dental care are more likely to have regular dental visits for their children than mothers who report both poor oral health and more negative attitudes about dental care for children (Hendricks et al 1990; Preston et al 2001). Vargas and Ronzio (2002) found that the utilization of dental services among children depended on children's dental needs. Children aged 6-18 years who had perceived or normative needs were more likely to be episodic users and less likely to have dental visits in the previous year or have a more regular pattern of dental care utilization than children with no needs (Vargas and Ronzio 2002).

Toothache or dental pain was the major driving factor for dental visits (Du et al 2000; Agostini et al 2001; Ekanayake et al 2001; Farsi et al 2004; Al Omiri et al 2006). But Jaafar et al (1989) reported that pain per se was a poor predictor of utilization of dental services (Jaafar et al 1989).

Types of treatment have a direct effect on the frequency of treatment. In Jordan, the number of treatment visits for treating traumatized teeth for children ranged from 3 to 17.2 visits according to type of treatment (Al Jundi 2004). In addition, school dental screening was reported to influence the frequency of dental visits or trigger the never-been-to-dentist children to have their first dental visit (Zarod and Lennon 1992). In contrast to this, Milsom et al (2006) found that school dental screening made only a small impact on dental attendance among British children (Milsom et al 2006). Dental insurance payment systems which are related to socioeconomic backgrounds also influence the frequency of dental visits. Dasanayake et al. (2002) found that children in Alabama State who were eligible for Medicaid were more likely to have dental treatment. Nevertheless, among the Medicaid group, the number of white children who visited a dentists was higher than black children and other racial groups (Dasanayake et al 2002). However when comparing children who were not covered by dental insurance with those with Medicaid, Medicaid-eligible children had twice the number of pain relief dental visits but fewer overall dental visits than those from more advantaged families, but were not covered by dental insurance (Edelstein 2002). Children who had private insurance coverage were more likely to have dental visits than Medicaid children (Manski et al 2001).

Besides the frequency of dental visits, time spent at each visit is also important. Time spent per dental visit also depends on dental chair times which vary because of various factors such as complication or kind of treatment, skills of dentists and co-operation of patients. Gift et al (1992) estimated that the time per visit could be 30 minutes to 1 hour for patients who visit the dentist routinely and preventively (Gift et al 1992). In Denmark where dental caries prevalence is relatively low and non-operative intervention was highly promoted and practised,

mean total treatment time varied from 44 to 58 minutes for 7-17 year old children (Thylstrup et al 1997). A longitudinal and retrospective study of time spent on treating dental trauma on 106 Danish children and adolescents revealed that, treatment for permanent teeth with uncomplicated trauma, required about 9.2 visits or 3.2 hours for individual, and for complicated trauma, 16.4 visits or 8.5 hours were required (Glendor et al 1998). However, the estimates of time per dental visit in these studies did not include travelling time or waiting time. Orthodontic treatment would be more time consuming per visit, and multiple visits would be required.

2.3.2 School absences caused by dental conditions and dental care

Dental conditions and dental care cause school absenteeism because of symptomatic or asymptomatic visits. On the one hand, untreated dental caries may progress to dental pain and eventually lead to school absence if children need to take time off from school because of pain or symptomatic treatment. On the other hand, attending dental visits can cause school time loss if visits occur during school time, especially to attend the school dental services.

Furthermore, when reflecting on the causes of school absence for dental reasons one should consider that they may be related to various kinds of dental problems or treatments such as preventive visits, treatment visits or emergency visits for pain relief or may occur because of infection, pain, or symptoms associated with untreated dental problems. As these conditions are very common in children in countries such as Thailand (Headquarters of Dental Public Health 2002; Malikaew et al 2003; Gherunpong et al 2004c) it is possible that the impact of dental problems on school absence could be high.

While there are numerous reports on medical conditions affecting children's school attendance, only few data of school absenteeism resulting from dental

problems are available. The school attendance systems in the United Kingdom only records school time loss using broad categories such as authorised or unauthorised absence (Department for Education and Skills, 2004). Other countries use more specific categories as illness reason, family/social reason and unexplained absence (Office of Prime Minister 1992; Rothman 2004). These existing systems do not differentiate and quantify the number of school hours lost for health reasons or whether it was because of medical or dental reasons. Furthermore, studies that measured school loss for dental reasons were mainly short term (Shepherd et al 1999; Naidoo et al 2001; Stewart et al 2002; Ratnayake and Ekanayake 2005), while those recording absences for longer periods were retrospective studies or used extrapolated data (Adams and Benson 1990; Gift et al 1992; Adams et al 1999). More importantly, there are no reports on long term data collection and prospective studies on school time loss for dental problems.

The reports which exist on school absenteeism related to dental problems vary in their details. Some studies documented only percentage of school absence. Some also provide number of school days lost and some also stated the reasons for absence. A study in Western Cape, South Africa, indicated that 70% of 8-10 year old children missed school because of dental pain over the last 2 months (Naidoo et al 2001). In Thailand, results from National Oral Health Survey in 2000-2001 indicated that the percentage of Thai children aged 12 years old, who missed school because of oral problems during the past year, was 14.3% (Headquarters of Dental Public Health 2002) and 8.8% in Phrae Province (Dental Public Health Department 2000c). A cross sectional survey in England found that 11.1% of 589 children aged 8 years had dental pain that affected their school attendance (Shepherd et al 1999). Among older Brazilian children (14-15 years old), 8.6% had school attendance affected by dental pain (Goes 2001). Another study showed that 74% of children with orofacial conditions missed school during the last 3 months because of problems with teeth, mouth, lips or jaws (Locker et al 2005).

One of the few comprehensive nationwide studies which recorded school absence as a social impact of dental problems and visits and where data on dental health was a special topic added as supplement to the year's questionnaire was the 1989 National Health Interview Survey on 50,000 US households. Gift et al (1992) reported that in 1989 annually there were over 51 million school hours missed as a consequence of dental problems and visits among American school-aged children (5-17 years old). Females and teenagers missed more school than males and younger children. That is around 18 million hours missed among males and 33 million hours among females. Nearly 20 million hours were missed in children aged 8-12 years and 25 million hours in the 13-17 years old group. On average 1,170 hours were missed per 1,000 children per year (Gift et al 1992). With such high levels of hours of school lost per year for dental reasons, it is very surprising that so little research has been done on this subject.

In the 1989 and 1996 US National Health Interview Survey, data on school loss days from dental conditions were also collected. But, in these two data sets, times of school loss due to dental conditions were collected differently from the special supplement survey mentioned above. That is, only the term 'dental conditions' was used not 'dental problems and dental visits' besides dental conditions was just one of the items among acute conditions items that were asked if it had caused school time loss in the interview process. Furthermore, school times lost were quantified in days not in hours. Results showed that in 1989, total number of school days missed was 954,000 days per year, 21 days per 1,000 children, whereas in 1996 the number had increased to 1,611,000 days per year and the average number of days missed were 31 days per 1,000 children (Adams and Benson 1990; Adams et al 1999). If estimates are made by converting the school days to school hours by national figures, the number of formal instruction hours per one school day for 13 year old children in US, was about 5.6 hours (U.S.Department of Education 2005). The total of school hours missed from dental conditions among 5-17 years old children in 1996 would be about 9,021,600 hours or 174 hours per 1,000 children per year. Yet, this did not include school time lost for dental visits. Recent studies in other countries have

measured dental problems and dental visits related to school absence and showed that the impact of dental problems on loss of school hours is prevalent and in some areas the number of school hours or school days lost is relatively high. Stewart et al (2002) conducted an interview survey in Saudi Arabia on impact of dental pain on Grade 3 Saudi schoolchildren. Among all respondents, in their lifetime, 67.3% ever experienced dental pain. When the study focused on the events during the past 4 weeks; 39.5% of children claimed that they experienced pain. In addition, impacts of dental pain were also assessed. Among children who had dental pain in the past 4 weeks, 27% of them missed school for different durations. Most children missed school for one day, 4.9% missed school for 2 days and 0.8 % missed 3 school days. And the mean number of school days missed was 0.34. Results also showed that girls missed school more frequently but boys missed school for longer duration. Furthermore, about 43% of children in the study reported visiting a dentist because of dental pain with the mean number of visits of 0.67 (Stewart et al 2002). In Sri Lanka, lifetime prevalence of oral pain was reported by 8 year old children. Among those who had oral pain in the past 2 months, 21.6% said that oral pain caused school absence (Ratnayake and Ekanayake 2005).

2.3.3 Association between school absence for dental reasons and socioeconomic status of children

Because school time loss due to dental problems has not been widely studied or documented, there is little data on the relationship between school absence for dental reasons with dental health and school absence and socioeconomic status of children. The aforementioned study in the US by Gift et al (1992) revealed that the socio-demographic background of children affected the impact of dental visits and problems on school absence. The numbers of school hours missed varied significantly according to socioeconomic level of parents. Children from households with incomes lower than $US 20,000, responsible adults with education of 12 years or less, and without dental insurance missed more school

time than children from higher socioeconomic levels. For example, children for whom the responsible adult had more than 12 years of education missed 20 million hours, but 32 million hours were missed among the respondents with less than 12 years education (Gift et al 1992). Similarly a study on school loss days due to illness or injury in general that did not differentiate whether it was medical or dental origins, showed that the less advantaged children had more school time loss than the more advantaged peers (Dey and Bloom 2005).

2.4 Socio-dental indicators

2.4.1 Studies related to socio-dental impacts on daily living or performances

The traditional oral health status measures using the biomedical model, which are assessed by clinical indicators, only measures physical status and neglects the social dimensions of oral disease. This led to the development of socio-dental indicators, now termed Oral Health Related Quality of Life (OHRQoL), which, assess the impact oral health problems have on daily functions, and how the disease interferes with day to day living (Leao and Sheiham 1995). Furthermore, there has been a search for outcome measures of health impact, to show quantifiable impact from oral health not just disease presence but also loss in other life dimensions. In the early development of socio-dental indicators there were several major theoretical works based on role or function disturbance. Locker (1988) suggested a set of concepts defined by Wood (1980) and Patrick (1982) which could be adapted to the WHO International Classification of Impairment, Disabilities and Handicaps (WHO 1980). This frame work by Locker is frequently used and mentioned in the development of socio-dental indicators. According to the WHO (1980) definitions of these are;

- *Functional limitation* is restriction in function customarily expected of the body or its component organ or system, such as limitation of jaw mobility.
- *Discomfort* is biomedical measures to the subjective appraisals of well-being response to disease, such as self-reported pain and discomfort or other physical and psychological symptoms.
- *Disability* is defined as "any limitation in or lack of ability to perform the activities of daily living. It includes not only ability restriction in mobility, body movement or self-care, but also other distinct dimensions of physical, psychological and social well-being".
- *Handicap* is defined as "the disadvantage experience by impaired and disabled people because they do not or can not conform to the expectations of society or the social groups to which they belong. The disadvantage is multidimensional and can involve loss of opportunity, actual material and social deprivation, and dissatisfaction".
- *Impairment* is defined as anatomical loss, structural abnormality or disturbance in physical or psychological processes, either present at birth or arising out of disease or injury, such as edentulousness, periodontium loss or malocclusion.

Through the shift to measures of impact of oral health in life, numbers of new dental indicators has been developed to measure the social impact based on the concepts of social and psychological impacts (Sheiham and Spencer 2002). These measures use markers that are part of daily routine which show impact of oral health on life. For example, Cushing et al (1986) developed a socio-dental indicator by measuring the social and psychological impact of dental disease on industrial workers aged 16-60 years based on five categories related to daily activities, including eating restrictions, communication restrictions pain, discomfort and aesthetic dissatisfaction (Cushing et al 1986). More recent indicators also include the Oral Health Impact Profile (OHIP) (Slade and Spencer 1994) and Oral Impact on Daily Performance (OIDP) in adults (Adulyanon et al

1996). In addition, recently, Gherunpong, Tsakos and Sheiham (2004) developed the Child-OIDP, that measured impacts of dental problems on daily performances among Thai primary school children (Gherunpong et al 2004b).

2.5 Use of school absence as marker of a socio-dental impact related to health problems in schoolchildren

One definition of a socio-dental indicator, is 'measures of the extent to which dental and oral disorders disrupt normal social role functioning and bring about major changes in behaviour such as an inability to work or attend school, or undertake parental or household duties' (Locker 1989). Reisine (1981) also suggested that a basis used for measuring the impact of dental ill health could be the disturbance in normal social functioning (Reisine 1981). In the case of school-aged children disruption in schooling would be a suitable measure of disturbance of normal life functions which could be recorded either by using a well constructed index or simple questionnaire.

School absence has been used as one of the items for the complex multi-dimension socio-dental impact measures such as CPQ (11-14), and Child-OIDP index (Gherunpong et al 2004a). The multidimensional 31-item Child Perceptions Questionnaire for 11 to 14-year-old children (CPQ(11-14)) was constructed to measure quality of life of children in that specific age. Among the social well-being domain, school performance plays a major role in the domain. Three out of 10 items in the domain were related to schooling. Namely, 1) missed school, 2) low concentration in school and 3) not wanting to speak/read out loud in class. Whereas in Child-OIDP, school performance was just one of the item measures, it was put in as "In the past 3 months, have mouth/tooth problems caused you any difficulty in carrying out your schoolwork e.g. going to school, learning in class, doing your homework" (Gherunpong et al 2004a). In addition, studies that measured impact of dental conditions on daily activities using one or two simple questions also included the impact on school attendance (Adams and

Benson 1990; Gift et al 1992; Shepherd et al 1999; Adams et al 1999; Naidoo et al 2001; Goes 2001; Headquarters of Dental Public Health 2002; Stewart et al 2002; Skaret et al 2004; Ratnayake and Ekanayake 2005).

2.5.1 Justification for using school absence as marker of socio-dental impact in school children

2.5.1.1 Use of work loss as a marker of socio-dental impact in adults

A number of studies have used inability to conduct daily performances as a measure of socio-dental impact in adults and work loss was one of the daily performances items commonly used to measure the socio-dental impact on adults (Reisine 1984; Locker and Grushka 1987; Macfarlane et al 2002). For example, a questionnaire survey on the prevalence of dental and facial pain in Toronto explored the impact on daily living; seeking for treatment behaviour, work loss, sleep disturbance, bed rest and worry (Locker and Grushka 1987). Reisine & Miller (1985) assessed the impact of dental disease on work loss and concluded that the impact of oral diseases should be conceptualized in terms of disruptions in social role performance using Parsons' sick role model to oral health conditions and concluded that disruption in normal social function could be used as a basis for marking the oral health impact and one of the main outcomes for a working age population is work loss (Reisine and Miller 1985). There was another study on dental problems related to work loss in particular. Gift et al. (1992) reported that in 1989, dental visits or problems accounted for 148,000 work hours lost per 100.000 workers, and 17,000 activity days beyond work and school time were restricted per 100,000 individuals. At the societal level, such problems and treatments among disadvantaged groups appear to have a greater impact (Gift et al 1992).

As previously mentioned, work loss was widely accepted and used as a parameter for measuring oral impact in adults and the rationale for using it could be that

work loss is observable, measurable and practical. If work loss is considered an impact from dental problems on daily functions in adults it is logical that school loss among children could be considered as a socio-dental impact from dental problems. And that should include not only health problems such as dental pain but also dental visits.

2.5.1.2 Use of school absence as indicator for general health impact

In medical research, school attendance has been frequently used as an indicator of social functioning in children (Weitzman et al 1982; Abu-Arefeh and Russell 1994; Carlsson et al 1996) or as an indicator for quality of life (Brook and Heim 1993). For example, Wietzman et al (1982) said that 'school absence is the ready made indicator to measure children's health (Weitzman et al 1982) and conducted a number of studies on children's illnesses related to their school absence (Weitzman 1986; Weitzman et al 1986a; Weitzman et al 1986b; Weitzman et al 1986c). This was justified because schooling is a major part of school-aged children's life and education has enormous long term influences on their life (Black 2004).

Furthermore, numbers of researchers investigating the impact of illness use school absence as a Quality of Life indicator or as a measure for impact of illness on schoolchildren. For example, several studies on respiratory illness used school absence as marker of morbidity. Gilliland et al. (2002) used respiratory illness-related absences as a measure of respiratory illness among 9-11 year old children in California, US (Gilliland et al 2002). In Australia, Slack-Smith, Read and Stanley (2004) measured the burdens of respiratory illness on childcare-age children, using absence time as a primary outcome measure (Slack-Smith et al 2004). Number of school missed days was also used to compare the quality of life between asthmatic children and their healthy peers (McCowan et al 1996). Studies on the impact of active and passive tobacco smoking on schoolchildren considered school absenteeism as a measure of a broad spectrum of adverse

effects of tobacco (Mannino et al 2002b; Alberg et al 2003; Gilliland et al 2003). In Ireland, the 10-year annual national school attendance database was examined to measure the health effects of environmental pollution on children (Houghton et al 2003). The quantity of all illness-related absences was also used for evaluation of the health related economic loss from ozone pollution in California (Hall et al 2003).

2.6 Use of school absence for measuring impacts from oral health problems in dentistry

As previously mentioned, medicine has used school absence to measure the impact of illness on school-aged children. On the other hand, there are relatively few studies on socio-dental impacts on school loss despite there being quite a few studies on sociodental impacts on work loss in adults. Most studies on oral impact in school-aged populations used aspects of schooling to measure impacts but only in terms of concentration in school or doing homework. They measured that retrospectively or over a short time frame.

From the evidence of extensive use of school absence measuring children's well-being in medicine and the evidence that dental problems are common among children and dental problems impact on schooling in large numbers of children worldwide it is apparent that dental problems and visits related school absence could be one of the practical and valid measures of social impacts of dental illness on schoolchildren. Moreover, it could be a general measure for school children in any country.

2.6.1 Dental impacts on schoolchildren' daily performances and severity level of impacts

Despite the frequency of dental impacts and oral impacts on daily performances of schoolchildren, the subject has not been studied in detail. There is good evidence from several countries showing that oral conditions impact on schoolchildren's daily performances such as eating, sleeping, and attention at school and their quality of life. Goes (2001) measured the prevalence of impacts of dental pain on Brazilian schoolchildren's daily activities. The study indicated the most reported impact from oral conditions was on concentration at school (21.7%). Other school activities such as school homework, having reading capacity affected and school attendance were also common; 9.8%, 10.1% and 8.6% respectively. In addition, dental pain frequently impacted on leisure activities (17.3%) and social activities such as going out to play with friends (13.1%). Dental pain also disturbed physical activities. Many schoolchildren could not play sports (14.9%) and some could not conduct home activities (18.7%). When these impacts are analysed in relation only to the children reporting dental pain, the prevalence of the main impacts were high. For example, 64.7% reported that their concentration at school was affected and 55.6% had their home activities curtailed and 51.4% had their leisure activities affected (Goes 2001). A study among 8 year old Sri Lankan schoolchildren measured the impact from dental pain. 74% of children had experienced a negative impacts as a result of the pain and 21.6% missed school because of dental problems (Ratnayake and Ekanayake 2005).

Impacts on schoolchildren's daily performances were also measured using a well established index, the Oral Impact on Daily Performances (OIDP) index, developed by Adulyanon et al (1996). It measures impacts on physical, psychological and social dimensions of oral health consequences. These three dimensions contain nine items of daily performance. The physical dimension includes performances of eating food; speaking; cleaning teeth; doing light physical activities such as housework or walking. The psychological dimension

includes sleeping and relaxing; smiling and showing teeth without embarrassment; maintaining usual emotional state without being irritable. Lastly, the social dimension refers to the performances of carrying out major work or social role; and enjoying contact with people. Studies using the OIDP index on Thai adults (Adulyanon et al 1996), an aged population in the UK and Greece (Tsakos et al 2001), and Tanzanian university students (Masalu and Åstrøm, 2003) has proven that this index is a valid and reliable instrument.

In the study conducted by Goes (2001), children were also asked if they had any impact on nine dimensions in the OIDP index on their daily life caused by their mouth or teeth. Among the physical activities, eating was the highest affected (15.1%), followed by cleaning teeth (3.1%), Almost the same prevalence was reported on speaking (2.4%) and playing sports (2.3%). Among the psychological domain, smiling was the most affected daily activity (8.7%), whereas a lower impact was on sleeping (4.2%) and emotional stability (0.7%) The last domain assessed was social dimension. It was assessed by the impact on the ability to perform schoolwork and enjoy contact with friends. Schoolwork was impacted by 3.0% and the enjoying contact with friends by 1.7% of the children. The OIDP index showed differences in the severity of impacts among dimensions. Enjoying contact with friends had the highest severity of impact, followed by sleeping and sports activities respectively. Despite eating had the highest reported prevalence (15.1%) it did not have the highest impact severity. In contrast, contact with friends was one of the least common impacts (1.7%) but had the highest severity of impact (Goes 2001).

Gherunpong et al (2004) carried out a study that measured oral impacts on daily performance in Thai primary schoolchildren. For this study the index was specially modified to suit children. The results showed an overall prevalence of impact of 89.8% in the past three months. About 85% of those with impacts had 1-4 daily performances affected out of eight performances. Again, eating was the most common performance affected (72.9%). High prevalence of impacts on other performances was also reported; emotional (58.1%), cleaning teeth

(48.5%), smiling (40.1%). Relaxing, social contact and speaking were less affected; 14.7%, 12.2%, and 9.9% respectively. The severity of impacts was large for eating and smiling and not severe for study and social contact performances (Gherunpong et al 2004c).

2.6.2 Association between dental impacts on schoolchildren's daily performances and socioeconomic status

Socioeconomic status was related with dental impacts in adults but not in children. Studies testing the 'Geriatric Oral Health Assessment Index" (GOHAI) of which measuring impacts from oral problems; physical function, psychological function and pain and discomfort among an elderly sample showed that participants who had lower socioeconomic status experienced more negative impacts (Atchison and Dolan 1990; Kressin et al 1997). In addition, Locker (1992) revealed that lower income groups scored higher on psychological impact than their richer counterparts. Studies on middle aged populations also found a negative association between income and impacts from dental pain (Leao and Sheiham 1995; Riley, III et al 2003). However, Leao and Sheiham (1995) found the association disappeared after controlling for clinical indicators such as the amount of calculus and deep periodontal pockets (Leao and Sheiham 1995).

Among younger age groups, apart from the fact that the number of studies on association between socioeconomic and dental impact is limited, there is no report on a direct association between socioeconomic status and impact of oral health despite much evidence on socioeconomic status being related to dental health status (Evans et al 1993; Nomura et al 2004; Jamieson et al 2004; Zurriaga et al 2004) and higher prevalence of dental pain (Slade 2001; Nomura et al 2004; Ratnayake and Ekanayake 2005; Bastos et al 2005). One of a few studies on this subject conducted in New Zealand did not find an association between oral health impact and level of education of adolescent's parents (Chen and Hunter 1996). The lack of association between the oral health impact and socioeconomic

indicator in New Zealand was assumed to be related to the level of egalitarianism in that society (Chen and Hunter 1996). However, with the limited number of studies, it is not possible to make generalisations about the association between socioeconomic status of children and oral impact.

From this review it is clear that there are very few studies on dentally related school absence. Those that have been done did not use longitudinal methodology, and were short term. In addition they were not detailed enough. Therefore, there is not a great deal of good evidence available. Further studies on the levels of school absence and factors associated with them are warranted.

Table 2.10: School absence caused by dental conditions among school-aged children

Health conditions	Author	Total time loss*	No./ (%) of children**	Average time/days loss***	period	Study type	Age (years)	Sample size	Population/Geographic
Acute dental conditions	(Adams and Benson 1990)	954,000 days	n/a	21 days per 1,000 child	1 year	Parent interview	5-17	45,711 household	US 1989 National Health Interview Survey
Dental problems and dental visits	(Gift et al 1992)	51,679,100 hours or 19,000,000 hours for 8-12 yrs old group	n/a	1,170 hour per 1,000 child or 1,120 hours per 1,000 8-12 yrs old child	1 year	Parent Interview	5-17	22,321 children (8,704, 8-12 yrs old children)	US Special supplement on Oral health care in 1989 National Health Interview Survey
Dental pain	(Chen and Hunter 1996)	n/a	9/1%	-	1 year	Children self administered questionnaire	12-13	1,074 children	New Zealand, school
Acute dental conditions	(Adams et al 1999)	1,611,000 days	n/a	31 days per 1,000 child	1 year	Parent interview	5-17	24,371 household	US 1996 National Health Interview Survey
Dental pain	(Naidoo et al 2001)	n/a	70 %	n/a	2 months	Children interview	8-10	1,025 children	Western Cape, South Africa, school

Table 2.10: School absence caused by dental conditions among school-aged children (continued)

Health conditions	Author	Total time loss*	No./ (%) of children**	Average time/days loss***	period	Study type	Age (years)	Sample size	Population/Geographic
Dental pain	(Shepherd et al 1999)	n/a	11.1 %	n/a	1 month	Children interview	8-10	664 children	Harrow, England, school
Dental problems	(Headquarters of Dental Public Health 2002)	n/a	14.3%	n/a	1 year	Children interview	12	8,892 children	Thailand, National Oral Health Survey 2000-2001
Dental pain	(Stewart et al 2002)		27%	0.34	1 month	Children interview	Grade 3 children	122 children	Saudi Arabia, school
Toothache	(Skaret et al 2004)	n/a	16.7%	n/a	lifetime	Children self administered questionnaire	12-20	18 children	Washington. US, school
Oral pain	(Ratnayake and Ekanayake 2005)	n/a	30/21.6%	n/a	2 months	parent self administered questionnaire	8	139 children	Sri Lanka, school
Dental pain	(Nomura et al 2004)	n/a	-/33.7%	n/a	1 year	Children self administered questionnaire	12-13	181 children	Southern Brazil

*Total school time loss **Number/ (%) of children absent from dental condition ***Average school time loss

CHAPTER 3

HYPOTHESES AND OBJECTIVES

3 HYPOTHESIS AND OBJECTIVES

3.1 Hypotheses

3.1.1 Hypothesis 1 - The prevalence of school absence and school time loss for *dental conditions and dental care*[1] among Grade 5 primary schoolchildren in Maung district, Lampang will be high.

3.1.2 Hypothesis 2 - The prevalence of school absence and school time loss for dental conditions and dental care will be higher than for medical reasons among Grade 5 primary schoolchildren in Maung district, Lampang

3.1.3 Hypothesis 3 - The prevalence of school absence for dental reasons will be higher in lower socioeconomic groups, poor dental health children and associated with school type.

3.1.4 Hypothesis 4 - The prevalence of dental impacts from dental pain and dental discomfort on daily activities of schoolchildren will be higher in lower socioeconomic groups, poor dental health children and associated with school type.

3.2 Objectives

3.2.1 Hypothesis 1. Objective 1 - To calculate the number of school hours missed due to dental reasons per 1,000 Grade 5 primary schoolchildren in one school year.

3.2.2 Hypothesis 2. Objective 2 - To investigate the difference in school hours missed due to dental reasons and all other reasons per 1,000 grade 5 primary schoolchildren in one school year.

[1] In this thesis when the term dental reasons is used it includes dental conditions such as dental pain and discomfort and also attending for dental care.

3.2.3 Hypothesis 3. Objective 3 - To assess the association between children's socioeconomic status and school absence due to dental reasons.

3.2.4 Hypothesis 3. Objective 4 - Investigate the association between dental health status and school absences due to dental reasons.

3.2.5 Hypothesis 3. Objective 5 - Investigate the association between school type and school absences due to dental reasons.

3.2.6 Hypothesis 4. Objective 6 - Assess the prevalence of impact of dental pain or dental discomfort on daily performances in Grade 5 primary schoolchildren.

3.2.7 Hypothesis 4. Objective 7 - To assess the association between children' socioeconomic status and the impact of dental pain or dental discomfort on daily performances.

3.2.8 Hypothesis 4. Objective 8 - To assess the association between dental health status and the impact of dental pain or dental discomfort on daily performances.

3.2.9 Hypothesis 4. Objective 9 - Investigate the association between school type and the impact of dental pain or dental discomfort on daily performances.

CHAPTER 4
GENERAL DENTAL CARE PAYMENT SCHEME AND SCHOOL DENTAL SERVICE IN LAMPANG

4 GENERAL DENTAL CARE SCHEME AND SCHOOL DENTAL SERVICE IN THAILAND

In order to clarify the groupings of dental care system of children included in the study, a brief description of the general dental care payment of Thai children and school dental service are presented here.

4.1 General dental care scheme for children in Thailand

In general all Thai children aged 0-15 years old are covered by one of the health care payment systems which cover medical care and dental care shown in Figure 4.1 even though they do not go to school or go to international schools. These schemes are

1. Thai government health care scheme "Children 0-15 years-old Health Care Scheme"
2. Parents' welfare from workplace Scheme
3. Parents pay privately

The first scheme is provided by the government to all children who have registered their name with the local health authority so they can have free dental services from public dental clinics during government office hours (8.30 am - 4.30 pm) on weekdays. But they have to pay for the dental services if they utilise public dental clinics outside the government office hours.

The second scheme, parents' welfare form workplace scheme, is provided for children whose parent or parents work for the government authorities, state enterprise and some private sections. These children are not allowed to use the "Children 0-15 years-old Health Care Scheme" but can at any time of day or week use public dental clinics free of charge. Some workplaces also pay for dental care by private dental clinics as well.

Thirdly there are children whose parents pay privately out of pocket for dental care. This group are children who are not registered with the local health care authority mostly because they had moved town and still have their name registered in another province, and/or do not have any alternative payment scheme. Therefore they are not eligible for free public dental care and have to pay for public dental care service at any time of day or week, at any public dental clinics or private dental clinics they attend. However, if this group of children then register with the local health care authority in the town where they are now living, they can use the "Children 0-15 years-old Health Care Scheme" and will be able to use free public dental care during office hours.

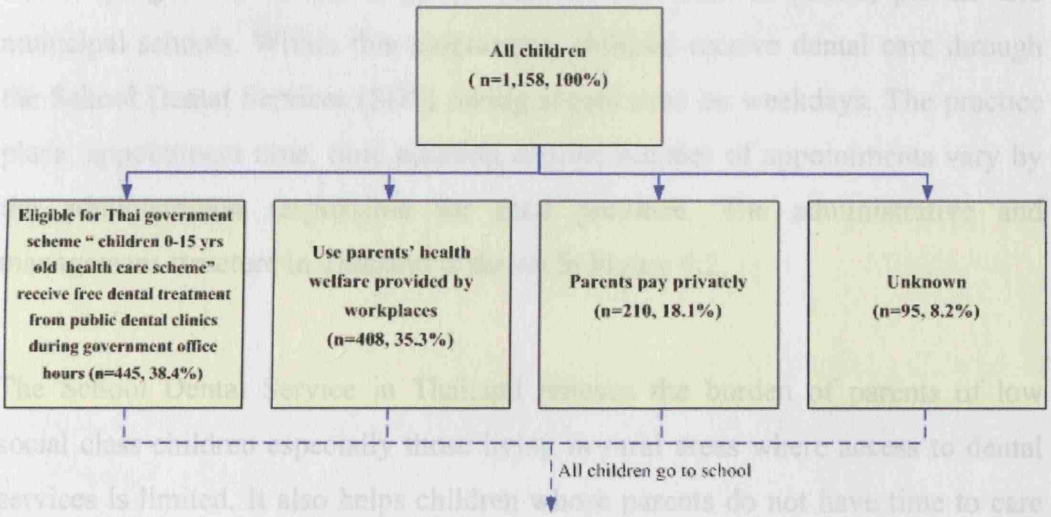


Figure 4.1: Distribution of general dental care scheme for children in the study, Maung district, Lampang, Thailand.

4.2 School Dental Service in Lampang province

In this study, it was planned to obtain data on children's dental visits. The School Dental Service is one of the most common dental services used by schoolchildren

in Thailand. Therefore, details of the School Dental Service in Thailand especially in Lampang province are described.

In Thailand, the Thai Government pays significant attention and provides a large budget for school-aged children's services, especially health services. One of the health domains, which has been focused on is oral health. The Ministry of Public Health started the Incremental Dental Care scheme in 1977, which lasted until 1986 (Headquarters of Dental Public Health 2002). This system was adapted to the Dental Surveillance Programme in 1988 in order to improve school children's oral health (Headquarters of Dental Public Health 1997). This dental programme has been evaluated and improved from time to time (Aroonprapan 1990). The current programme covers every primary school child in public, private and municipal schools. Within this programme, children receive dental care through the School Dental Services (SDS) during school time on weekdays. The practice place, appointment time, time duration and the number of appointments vary by the administration responsible for each province. The administrative and management structure in Thailand is shown in Figure 4.2.

The School Dental Service in Thailand relieves the burden of parents of low social class children especially those living in rural areas where access to dental services is limited. It also helps children whose parents do not have time to care for their children's oral health. Nevertheless, since all services provided by School Dental Service, either dental screening or dental treatments are provided during school time, school hours loss that is being caused by the service should be studied and evaluated to make the School Dental Service benefit more to children and particularly those with high caries rates. Very little data exists on the costs, in terms of hours of schooling missed, because of dental problems and dental treatment. The most recent National Health Survey Report in Thailand reveals that in the year 2000, 14.3% of children aged 12 years old missed school because of a dental problem but the number of missing school hours was not reported (Headquarters of Dental Public Health 2002).

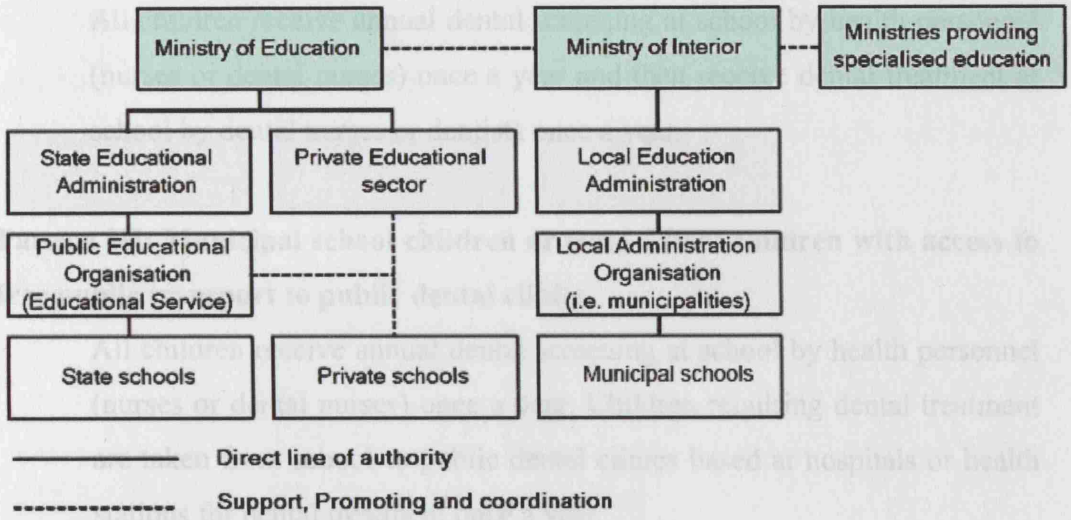


Figure 4.2: Administrative and Management Structure in Thailand.

4.2.1 Patterns of dental screening and dental care provision for primary school children in Maung District, Lampang, Thailand

The pattern of dental care by SDS that children received depends on type of schools children are studying at and does not depend on the general dental care scheme they are using.

There are three patterns of dental screening and dental treatment for schoolchildren in Lampang;

Pattern I: Children in private schools and some state schools in city centre areas.

All children receive only annual dental screening at school by health personnel (nurses or dental nurses) once a year. Then children are recommended to obtain dental care by private arrangement.

Pattern II: Children in state schools situated far from local public dental clinics or mobile dental units are available.

All children receive annual dental screening at school by health personnel (nurses or dental nurses) once a year and then receive dental treatment at school by dental nurses or dentists once a year.

Pattern III: Municipal school children or state school children with access to free public transport to public dental clinics.

All children receive annual dental screening at school by health personnel (nurses or dental nurses) once a year. Children requiring dental treatment are taken from school to public dental clinics based at hospitals or health stations for dental treatment once a year.

Plans of School Dental Service (SDS) in Maung district, Lampang and in the study is shown in Figure 4.3 and Figure 4.4.

4.3 Dental treatment for primary school-aged children provision

Dental treatment for primary school-aged children is provided in the following ways: Children can either obtain dental treatment in the SDS or by private arrangement or fee paying.

Under SDS the following three options exist:

1. dental services at local public hospitals* and health stations*,
2. Municipal health centres* and,
3. Mobile clinics at schools

*The local public hospitals, health stations and municipal health centres provide treatment for the general public but they also assign certain days or times to provide dental treatment for School Dental Services.

Private arrangement or fee paying

Parents who prefer to arrange dental care for their children themselves and parents who do not permit their children to receive dental treatment by School Dental Services at all, can take their children to private dentists or use facilities at the public hospitals or health centres that are not part of the School Dental Service (SDS).

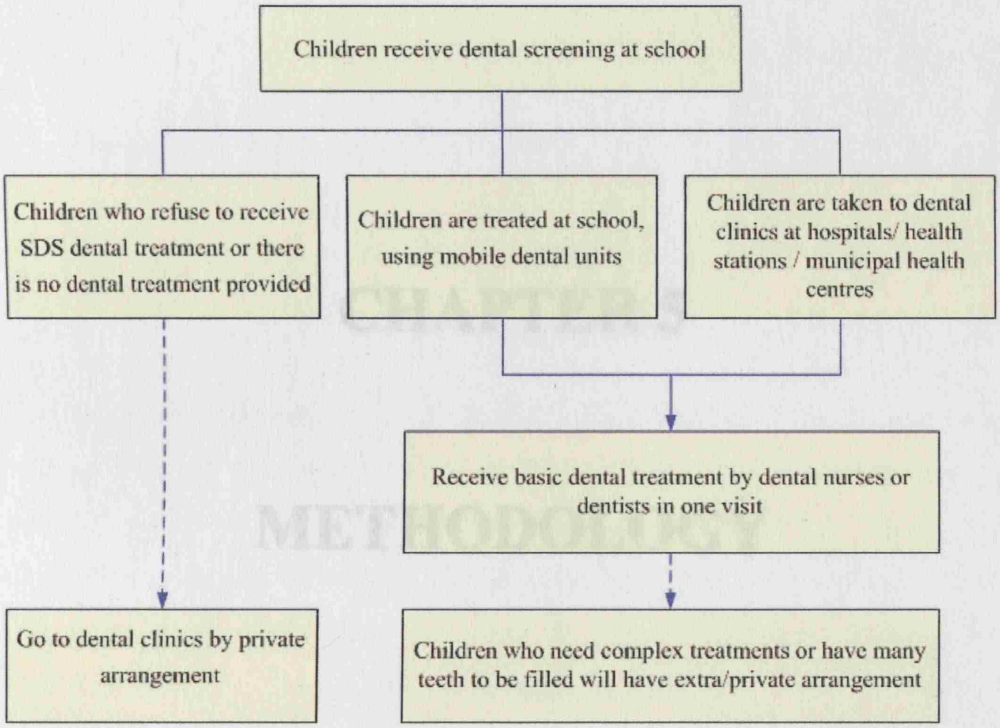


Figure 4.3: Plan of School Dental Service (SDS) in Maung district, Lampang, Thailand.

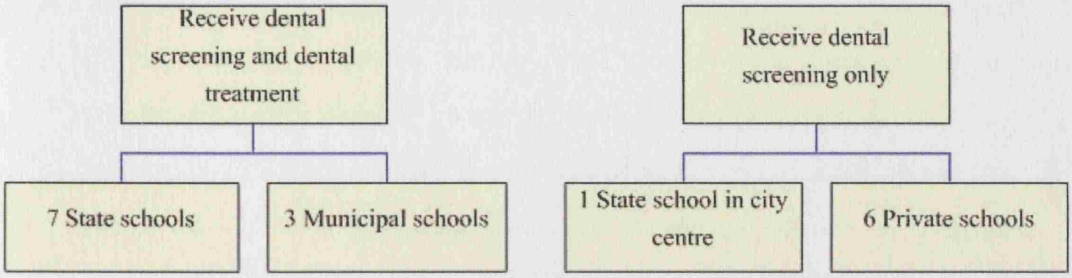


Figure 4.4: School Dental Service provision in Maung district, Lampang, Thailand for the 17 schools participating in the study.

CHAPTER 5

METHODOLOGY

5 METHODOLOGY

In this section the methodological issues are discussed; design of the studies, the geographical location of the studies, study population, pilot study, sampling method, research instruments and procedures, data analysis and ethical considerations.

5.1 Design of the study

The present study uses a multi-stage quantitative approach with prospective longitudinal study designs.

The longitudinal design is the method of choice for an observational study (Altman 1994) or an analytic survey that takes place over the forward course of time with more than single phase of data collection (Bowling 1997). There were 4 sub-studies in this research study. The order is determined by Thai primary school term time; term1 starts from mid May to October and term 2 starts from November to March. The list of 4 sub-studies is as follows:

- Sub-study I: *Analysis of school daily attendance reports and collecting data on school absence for dental, medical and social reasons among Grade 5 primary schoolchildren in Lampang.*
- Sub-study II: *The association between dental disease levels and school hours missed for dental reasons and impact from dental pain and discomfort among Grade 5 primary schoolchildren in Lampang.*
- Sub-study III: *The association between demographic, social factors and dental health status with school time loss for dental reasons and between the impacts from dental pain and discomfort on daily performances among Grade 5 primary schoolchildren in Lampang.*

- Sub-study IV: *Study of school time loss for dental care provided by School Dental Service among Grade 5 primary schoolchildren in Lampang.*

5.2 Study area and geographical location of the study

The study was conducted in Lampang province in Northern Thailand. Lampang was selected for this research study because it has a diverse population with a variety of socioeconomic classes. That made it very suitable for this study. Lampang is located in Northern Thailand, about 600 kilometres from Bangkok. The area of the province is 12,533.961 square kilometres. Lampang is divided geographically into 3 parts: a).the Upper level: densely forested high mountains and the source of rivers, b) the Middle level: the valley floor and the river banks, c) the Lower level: the unforested areas. The population of Lampang was 810,838 in 2003 which consist of 402,208 males and 408,630 females. The largest population reside in Maung district. The average income of the population is 9,759 baht (£140) per month (Office of National Statistics 2003).

Lampang province is divided into 13 districts, 100 sub-districts, 917 villages, 1 municipality (Office of Prime Minister 1992). In the academic year 2003 Lampang had a total of 638 schools, 7,475 teachers and 150,015 students. More than 60% of the students were primary school students. In Maung district, numbers of children per school and per class in each school varied according to different factors, such as location of schools, density of population of the area, reputation of schools on academic achievement and teachers' attention to students. In Grade 5 which is the target population of this study, numbers of students per class in each school type were quite diverse. Size of class varied between 5 and 50 children in state schools. Municipal schools had 30-43 students per class whereas private schools classes contained between 28-52 students. The Thai primary school year is divided into 2 terms; term1 starts in May and ends in October and term 2 starts in November and ends in March.

Lampang has 19 district hospitals with, 1,599 beds providing modern medical services. There were 15 Ministry of Public Health hospitals with 1,240 beds inclusive, 1 Military hospital which contains 150 beds and 1 state enterprise hospital. There are also 2 private hospitals with 147 beds. The overall average is 1 bed per 511 people. There are 217 doctors, 56 dentists (33 in Maung district), 57 pharmacists and 1,114 nurses. The ratio of doctors to population is 1:6,081. The dentist to population ratio is 1:13,900. In Maung district, 1 general hospital, 5 large health stations 19 private dental practices, and 1 Municipal Dental Clinic offer a school dental service for schoolchildren. Maung is the major district of Lampang province. The living standard of people in Maung is about the Thai average. The central part of Maung district is highly concentrated with business activities, is governed under the responsibility of the Lampang Municipality, and is called '*the municipal area*'. The remaining part of Maung district, which surrounds the municipal area, is less densely populated and is called '*the outer municipal area*'.

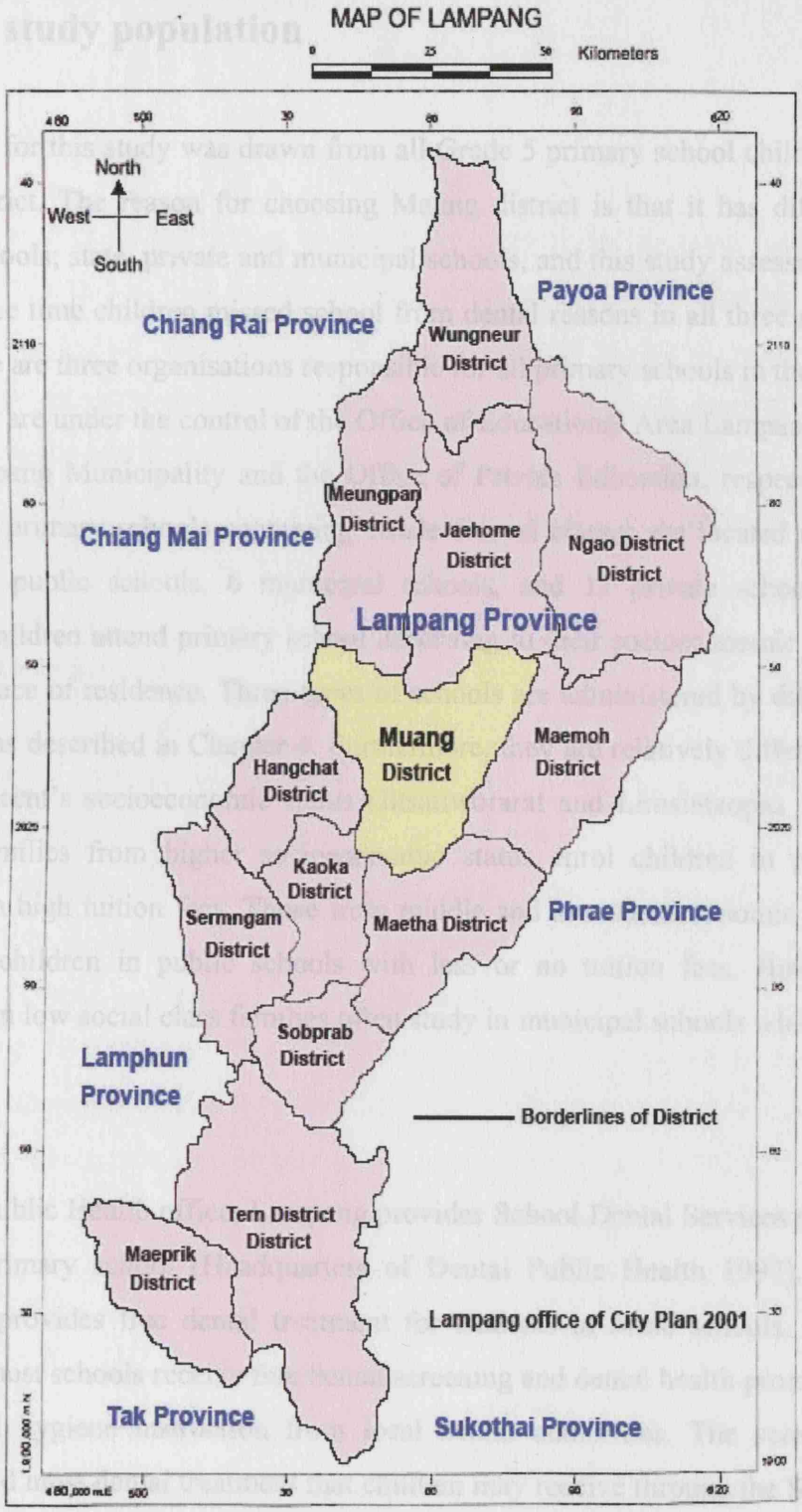


Figure 5.1: Map of Lampang province, Thailand.

5.3 The study population

The sample for this study was drawn from all Grade 5 primary school children in Maung district. The reason for choosing Maung district is that it has different types of schools; state, private and municipal schools, and this study assessed and compared the time children missed school from dental reasons in all three school types. There are three organisations responsible for all primary schools in the area. The schools are under the control of the Office of Educational Area Lampang area 1, the Lampang Municipality and the Office of Private Education, respectively. Eighty-four primary schools containing Grade 5 level classes are located in this district: 66 public schools, 6 municipal schools, and 12 private schools. In Thailand, children attend primary school according to their socioeconomic status and their place of residence. Three types of schools are administered by different authorities as described in Chapter 4. Furthermore, they are relatively different in terms of parent's socioeconomic status (Jitsatiworarat and Limsintaopas 1997). Usually, families from higher socioeconomic status enrol children in private schools with high tuition fees. Those from middle and low socioeconomic status enrol their children in public schools with less or no tuition fees. However, children from low social class families often study in municipal schools which are free.

Provincial Public Health office, Lampang provides School Dental Services (SDS) for every primary school (Headquarters of Dental Public Health 1997). This programme provides free dental treatment for students in some schools, while students in most schools receive free dental screening and dental health promotion such as oral hygiene instruction from local health authorities. The screening procedure and most dental treatment that children may receive through the School Dental Service take place during school hours. Apart from the School Dental Service, children can also use their general dental care scheme for dental care. Details of School Dental Services administration and general dental care scheme in Lampang are described in Chapter 4.

5.4 Study implementation

5.4.1 Pilot study

Generally a pilot study is designed to assess the logistics for the main fieldwork, the quality of the data collection forms and to obtain reliable estimators for use in the main study. In this present study, the pilot study was conducted prior to the main study to assess the dental examination and questionnaire administration and to test the psychometric properties and practicality of all research instruments. The two schools participating in pilot studies were located in Maung district but were not chosen to be in the main research study.

a) Dental Examination

The pilot study for the dental examination was carried out in December 2003. The date was set according to the availability of the other two dentists from the Provincial Public Health Office of Lampang which already had a set plan for surveying the dental health status of pre-school children during the same period. One primary school was contacted and after sending positive consent forms to parents, 105 of Grade 5 and Grade 6 students agreed to participate in the pilot study. Three dentists took part as examiners. One of the dentists was chosen as a gold standard, taking into account that she is experienced using the WHO Criteria several times for Thai National Oral Health Survey. The steps for the pilot study were as follows; at first, the 3 examiners trained by practising and made clarification of the criteria used by viewing pictures of variety of caries lesions. Then, examiners practised individually on children. Any ambiguous points were discussed until everyone was confident of conducting the dental examination on their own. At the next visit, each examiner examined another 15 children twice for intra-examiner reliability (WHO 1997) then the other two examiners individually examined 15 children against the gold standard examiner. This was for inter-examiner reliability. Cohen's unweighted Kappa coefficient was used to analyse level of agreement (Altman 1994). The inter-examiner agreement was excellent

and for the intra-examiner agreement, Kappa scores were also at a good level (Table 5.1). Methods of the calibration exercise were based on the WHO oral Health Survey Manual (1997). The results showed that calibrated dentists were conducted at acceptable levels and, consequently, participated in the main study.

b) Questionnaire administration

The questionnaires used in this study are self administrated for students (QS) and self administered for parents (QP) (Appendices 4 and 5). At first, the questionnaire items were tested informally before the pilot studies. The early drafts of the questionnaire were tested on family, friends and other students of a similar age group. Afterwards the questionnaires were tested on panels of Grade 5 children and parents who were also asked to provide feedback. Language and format were commented on and adjusted by three primary school teachers to make it clear and comprehensible for this study group. Next, questionnaires were sent for comment to three dentists, including two working in the dental public health field and one providing school dental services for primary schoolchildren. When the questions seemed to be working well with these people, they were pilot tested. The questionnaire pilot was conducted twice.

The first pilot was carried out in March 2004 among 45 Grade 6 students. Corrected inter-item total correlation and Cronbach's alpha were used to assess internal reliability of the scale type questions. The results showed good reliability allowing them to be used in the main study. Each child was checked to see if there was any difficulty in understanding the language, contents, sequences of questions and time spent on administering the questionnaire. The overall response for the parent's questionnaire was 100%. The pilot results showed that the administration time was too long for children of this age (60 minutes) since they lost concentration before the end of the questionnaire administration and there were also some questions that were not clear to children or not necessary. Therefore, each question was evaluated again for its inclusion and questions relating to parental socioeconomic status and frequency and duration of School Dental

Service treatment were eliminated since many children did not know the answers and these questions are already asked in the parent questionnaire or recorded in the School Dental Service observation form. Other changes made were rephrasing and replacement of some items.

In addition, to ensure that the questionnaires were suitable for use in the main study, the second pilot was conducted in other school on 67 Grade 6 children. The response rate from both children and parents was 100%. The results on Corrected inter-item total correlation and Cronbach's alpha on the dental impacts on daily performance questions were good; Alpha =0.77 and Standardized item alpha =0.78 (Table 5.2). With this questionnaire, children seemed to be more relaxed while answering, and time taken to complete it was more acceptable at 35 minutes. The final version of the questionnaire used in the main study was very similar to the one used in the second pilot, only some questions were re-ordered to make the questionnaire flow better.

Table 5.1: Kappa score for intra-examiner agreement and inter-examiner agreement during pilot study (n_1=15, n_2=15, n3=15, n_4=15)

Examiner(s) agreement	Kappa score
Intra-examiner	
Gold standard	0.88
Examiner 1	0.84
Examiner 2	0.95
Inter-examiner	
Gold standard and Examiner 1	0.81
Gold standard and Examiner 2	0.80

Table 5.2: Internal reliability analysis of dental impacts on daily performance items in children questionnaire: Corrected Item-Total Correlation, Cronbach's Alpha, Standardised alpha and Cronbach's Alpha if item deleted of the Scale type items in the second pilot study (n=67)

Items	Corrected Item-Total Correlation	Alpha if Item deleted
Eating	0.23	0.79
Speaking	0.40	0.76
Cleaning teeth	0.55	0.73
Sleeping	0.50	0.74
Maintaining emotion	0.54	0.73
Smiling	0.61	0.72
Study	0.57	0.73
Contact people	0.41	0.75
Alpha		0.77
Standardized item alpha		0.78

5.4.2 Preparation of documents

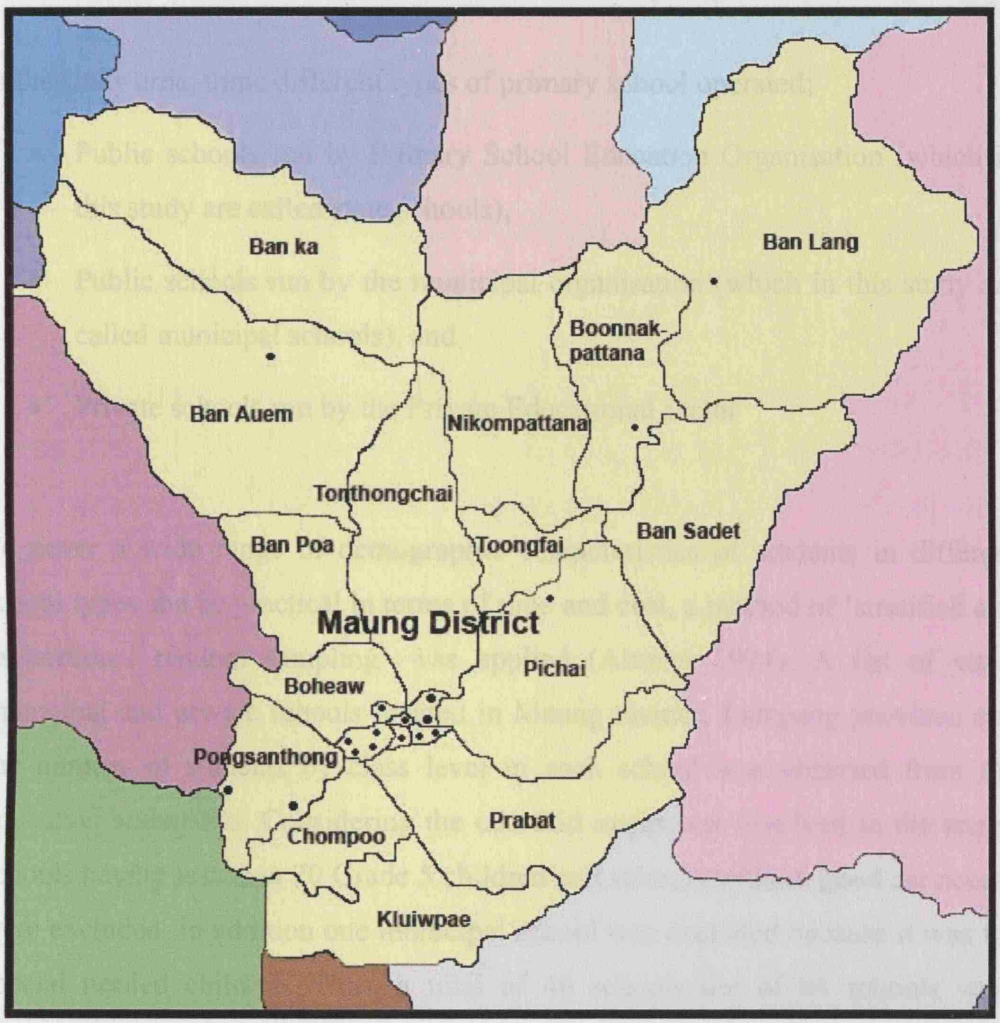
All documents were initially constructed in Thai language and translated to English and verified by an expert. The Thai version documents were used in the study.

5.5 Sampling methods

5.5.1 Sample selection

The study population included children who attended Grade 5 level primary schools (age 10 – 12 years old) in Maung district. The reasons for choosing these children are as follows;

1. This group was representative of the children of school age in Lampang, since most children attend primary education (Grade 1 - Grade 6) because it is compulsory.
2. Primary school children are the main target for the dental services in Thailand. The Thai government pays for a full range of dental services on this group (Headquarters of Dental Public Health 1997). Therefore the results could provide useful policy planning purposes information for dental health care provision.
3. In this age group the majority of permanent teeth have erupted.
4. Children attending Grade 5 of primary school have a compulsory dental care programme, so dental care and its influence on school attendance could be measured.
5. They are also suitable for the 1 year observation period of this study, starting from final semester of 2003 and finish in first semester of 2004. Most Grade 5 schoolchildren participating in the study will continue their study in the same schools for the next academic year, as Grade 6 level is the final year of Thai primary educational level.
6. The pilot studies had shown they were capable of answering a self administered questionnaire.



• = location of school selected

Figure 5.2: Map of Maung District and distribution of schools selected.

5.5.2 The sample size estimations and sampling methods

In the study area, three different types of primary school operated;

- Public schools run by Primary School Education Organisation (which in this study are called state schools),
- Public schools run by the municipal organisation (which in this study are called municipal schools), and
- Private schools run by the Private Educational sector

To cover a wide range of demographic characteristics of students in different school types and be practical in terms of time and cost, a method of 'stratified and proportional random sampling' was applied (Altman 1994). A list of state, municipal and private schools located in Maung district, Lampang province and the number of students by class level in each school was obtained from the education authorities. Considering the cost and manpower involved in the study, schools having less than 20 Grade 5 children and schools without good car access were excluded. In addition one municipal school was excluded because it was for special needed children. Thus, a total of 40 schools out of 84 schools were eligible.

Sample size depends on the purposes, scope and type of the study. In this study, the main objectives are: a) record the prevalence of dental related school absence, b) to assess whether those children attending different school types and children in less supportive and less favourable social environments have a higher prevalence of dental related school absence and higher dental impacts on daily performances. Therefore, the sample size should have enough power to answer these questions.

5.5.3 Sample size calculation

Sample size calculation was based on the prevalence of school absence for dental reasons. In terms of sample size calculation, the study calculated the sample size requirements based on three pieces of information: a) the expected proportions of school absence for dental reasons in advantaged and disadvantaged children, b) the significance level and c) the power of the test (Altman 1994).

The calculation used an assumption based on the data from the Dental Health Surveys in Thailand (Dental Public Health Department 2000b; Dental Public Health Department 2000c) that the prevalence of missing school due to dental problems among the socially advantaged children in Grade 5 children in Northern Thailand was about 9% and among socially disadvantaged children was 15%. It was assumed that the power of the test was 80%. The confidence interval used was 95%. Sample size calculation was made with the statistical programme Epi Info version 6; a minimum of 984 children were required (Fleiss et al 2003). In order to take into account potential non-response we over-sampled by 10%. Consequently, the minimum total sample should be 1,100 children.

5.5.3.1 Sample selection for the study

The main criterion for selecting the sample was to cover the wide range of dental health problems and social characteristics. The multi-stage sampling method was used to select the sample for all 4 sub-studies. Schools were the primary sampling units and were categorised into three groups according to their type; state, municipal and private. Next, all schools were stratified by school type into strata according to the school size based on Ministry of Education criteria, namely; a) state schools were stratified into 3 strata: small (< 200 students), medium (201-500 students), large (> 500 students), b) municipal schools had 1 stratum, (c) private schools were stratified into 2 strata: small (< 1,500 students) and large (> 1,500 students). Proportional sampling was used to calculated the number of

children required from each of the 3 school types, see step two of calculation which follows. Then, further proportional sampling was used to calculate the number of children required from each strata of each school type, see step three of calculation which follows. Lastly, a simple random method was used to select the sample of Grade 5 schoolchildren by class in each school strata frame. Each class in each strata had an equal probability of being selected used systematic sampling. Given that data will be collected longitudinally and from many data sources, for practical purposes the whole classroom of children were selected and numbers of children were added until the minimum required number of children reached the calculated sample size. Thus, the final sample invited to participate in the study was 17 schools, 30 classrooms and 1,222 children. Steps of sampling methods and sample size calculation are as follows;

1. Calculation of sample size required for the study (1,100)
2. Calculation of number of children required from each school type (A);

$$A = \frac{Number\_of\_Grade5\_children\_in\_the\_school\_type}{Number\_of\_Grade5\_children\_in\_all\_school\_types} \times 1{,}100$$

3. Calculation of number of children selected from each school stratum (B);

$$B = \frac{Number\_of\_Grade5\_children\_in\_the\_school\_stratum}{Number\_of\_Grade5\_children\_in\_the\_school\_type} \times A$$

4. Class were selected randomly. If the selected class did not have the required number of children for each school (see 3 above), then another class in that school stratum was selected until the required number of children was obtained.

Table 5.3: The numbers of selected children in selected primary schools in Maung district, by school types

School type	Stratum by school size	Number of schools eligible	Number of classes eligible	Number of Grade 5 children eligible	Number of classes selected	Number of Grade 5 children selected
State schools	Large	4	20	918	6	288
	Medium	7	7	212	2	67
	Small	13	13	313	4	99
Total		24	40	1,443	12	454
Municipal schools	n/a	5	9	373	4	150
Total		5	9	373	4	150
Private schools	Large	5	20	993	9	335
	Small	6	19	690	5	283
Total		11	39	1,683	14	618
Overall Total		**40**	**88**	**3,499**	**30**	**1,222**

5.6 Data collection

Data collection was carried out over a period of 12 months, from November 2003 to November 2004. The data collected consisted of two main types: clinical (dental examination) and Non clinical (socio-demographic, oral impact, dental care time and school absent hours). Data were collected through clinical examination, self-administered questionnaires, school daily attendance records and dental care time observations.

5.6.1 Clinical data

The clinical data comprised an assessment of dental status, according to WHO criteria (WHO 1997). Dental caries was measured by the DMFT index. Periodontal status was not recorded for the study but children with periodontal conditions (gum bleeding and dental calculus). Their parents were informed about the condition. The detailed codes and criteria of dental decay and the examination form are shown in Appendix 3. Examination settings were arranged as designed in the pilot study and were conducted in the area with the best natural light, for

instance in the corridor, the auditorium or the canteen. Artificial lights were used when the natural light was not sufficient. Children were examined on a supine position with their heads on a flat pillow on a bench and the examiners sitting on the same bench in the position of 12 o'clock to the child's mouth.

The dental examinations were performed by three dentists, one acting as a gold standard, accompanied by a trained recorder for each dentist, and one or two organising clerks, depending on the number of children. Trained recorders had the forms and essential stationery. A list of criteria used was also provided for each examiner. Organising clerks took care of the fieldwork setting and also arranged the 10% of duplicate examination for the dentists.

At all times, cross-infection control measures were practised. Each child was examined by using a fresh set of dental instruments comprising a plane mouth mirror, a periodontal probe conforming to WHO specifications, cotton pliers and a piece of sterilised gauze pad. Examiners used a new pair of gloves for each child's dental examination. Instruments were sterilised at the end of the day.

5.6.2 Non-clinical data

5.6.2.1 Daily school attendance records

The data on school attendance was recorded for 2 terms (2nd term of 5th Grade and 1st term of 6th Grade) which was equal to one Thai academic year. Class teachers of the selected classes recorded daily school attendance of each child on the form (Appendix 1) given to them by the author. Details of form and filling instruction were explained before the data collection started. Five main reasons for absence were listed, place where a child was during absence and also the length of time missed from school. As this study was being conducted for a long period of time, the author or research staff arranged monthly visits with class teachers to collect

the forms, in order to keep track and ensure the accuracy of data. When forms were collected, each form was checked for accuracy and any ambiguous details were clarified with class teachers and students who missed school.

5.6.2.2 Questionnaires

a) Self-administered questionnaire for schoolchildren (QS)

The questionnaire consisted of items on socio-demographic data, oral health behaviour and socio-dental data. Questionnaire items on the impact of dental problems on daily activity were adjusted from items of the Child-OIDP (Gherunpong et al 2004a), as they had been tested for its psychometric properties among Thai schoolchildren in the same age group.

The author accompanied by an assistant distributed self- administered questionnaires to children in the classroom when they were all together. The assistant helped with the questionnaire administration by distributing and collecting questionnaires. Questionnaires were checked upon return to ensure completion. If there were any missing answers, children were asked for a response. When questionnaires were administered to more than one class group at the same time, other research assistants helped with the questionnaire administration. To assess test-retest reliability, duplication of questionnaire administration was conducted one week after the first administration on 10% of the total number of children who completed the questionnaire.

Efforts were made to improve the response rate. If a child was absent on the questionnaire administration day, the author went back to that school another day and asked the absent child to complete the questionnaire.

b) Self-administered questionnaire for parents (QP)

Questionnaires were sent to parents via the children. After completed their questionnaires, each child was given a questionnaire with the research number labelled for their parents. The importance of returning the parents' questionnaire was emphasised. Children were advised to help their parents if they were illiterate. Questionnaires were returned via children after they had been completed.

At least one visit was made to each school to collect the parent's questionnaires. For test-retest reliability, 10% of parents answered questionnaire for a second time, one week after they answered and returned the first questionnaire.

5.6.2.3 Dental care time Observation

a) School dental service

The author made contact with the dental health authorities responsible for providing school dental service for the selected schools and asked for the schedule of screening and dental treatment for each selected school. The research team arranged the observation date according to the school schedule. Assigned research staff who had been instructed in form filling, observed the dental care and recorded time using a stopwatch. Data were collected in the School Dental Service Observation form (see Appendix 6) at the dental clinics, hospitals or at the schools, wherever the school dental services offered care. The School Dental Service included screening, treatment, prevention and dental health education. Data collected on time spent per one dental visit in this part of study consisted of:

- travel time,
- waiting time,
- dental chair time, and
- number of dental visits per year.

5.7 Permission and Ethical considerations

This research project was submitted for permission to the Ethical Review Committee for Research in Human Subjects of the Ministry of Public Health, Thailand and also to the Human Experimentation Committee, Faculty of Dentistry, Chiang Mai University, Thailand.

Local Health Authorities and Primary Education Authorities of the study areas were contacted in order to explain the purpose of the study, to gain their permission and co-operation. Also the list of all primary schools in Lampang was obtained. After the eligible schools were selected, principals of the chosen schools were contacted by a letter describing the research project and to asking for their permission. A supportive letter signed by the Professor of Dental Public Health at University College London was also attached. Later the author made personal contact explaining the purpose of the study and introducing the research team. At this stage, a list of Grade 5 students and school's timetable were acquired from each school. Then each class teacher was contacted personally to gain their willing co-operation since this research required long term support from class teachers in obtaining data.

Children in every randomly selected classroom were approached at their school and the author gave them an explanation and answered all the enquiries they had about the research. A letter containing positive consent form, details of the study and advanced appreciation was sent to parents via the children. Participants were the children who returned the consent forms signed by the parent. Moreover, consent from children had to be obtained as well. After the dental examinations every child received a letter informing them of their oral health status and suggesting any necessary dental treatment.

5.8 Defining variables

The first step of the analysis was to define the variables to be used. Outcome variables and explanatory variables were defined based on the study hypotheses and objectives.

5.8.1 Outcome variables

There are two outcome variables in this study. School absence for dental reasons was the most important outcome variable. Dental impacts on daily performances variable was another important outcome. They are described:

School absence for dental reasons

School absence for dental reasons was a binary outcome created by transforming the overall school absence time for dental reasons in one school year recorded in daily school attendance reports and school absence for dental treatment by SDS. The variable was coded as follows:

0- Absent for dental reasons

1- No absence for dental reasons

Note: dental screening by SDS was not included in the school absence for dental reasons outcome.

Dental impacts on daily performances

This variable expresses whether children's dental pain or dental discomfort impacts caused by their most recent dental pain or dental discomfort on their daily life or not. Any impacts on eight daily performances were summed up and transformed to a binary variable. The variable was coded as:

0- Had impact(s) on daily performances

1- No impact on daily performances

5.8.2 Explanatory variables

The main explanatory variables are demographic, social variables, and clinical status variables. They are sex, age, socioeconomic status (father's and mother's educational level, family income), school type, dental care payment scheme, parent's marital status, number of decayed teeth and number of filled teeth. The variables considered as explanatory variables in this study were selected taking into account the background literature. In the analyses each variable was tested for its predictor effect on the outcome and also tested for its role in the model building.

Sex

The variable was coded as

0- Male

1- Female

Age

Age at the last birthday was recorded and was categorised and coded as:

0- 9-10 years old

1- 11 years old

2- 12- 13 years old

Father's educational level

Father's educational level was obtained from the answer to question 3.1 of the parent's questionnaire. Categories were defined and recoded as:

1- Primary level

2- Junior-high to high school level

3- Vocational level

4- Degree level

99- Unknown

Mother's educational level

Mother's educational level was obtained from the answer to question 3.2 of the parent's questionnaire. Categories were defined and recoded as:

1- Primary level
2- Junior-high to high school level
3- Vocational level
4- Degree level
99- Unknown

Family income

This variable was obtained from the answer to question 4 of the parent's questionnaire. It presents the monthly income from all family members. Categories were defined and recoded as:

1- Less than 3,000 baht
2- 3,001-5,000 baht
3- 5,001-8,000 baht
4- 8,001-15,000 baht
5- More than 15,000 baht
99- Unknown

School type

There are three types of school in the study area. The variable was coded as:

1- State schools
2- Municipal schools
3- Private schools

Dental care payment scheme

This variable was obtained from the answer to question 5 of the parent's questionnaire. It was the payment scheme under which children utilised the dental care services. The variable was re-categorised and coded as:

0- Parent's health welfare scheme or pay privately
1- Thai Government health care scheme

Parent's marital status

This variable was obtained from the answer to question 6 of the parent's questionnaire. It presents the co-habiting status of children's parents and was coded as:

0- Both parents

1- Single parent

Number of decayed teeth

The numbers of decayed teeth was obtained from clinical examination and records the numbers of decayed teeth in both deciduous and permanent dentitions, excluding the third molars. The variable was categorised and coded as:

0- No decayed teeth

1- Decayed teeth > 0

Number of filled teeth

The numbers of filled teeth was obtained from clinical examination and represents the numbers of decayed teeth in both deciduous and permanent dentitions, excluding the third molars. The variable was categorised and coded as:

0- No filled teeth

1- Filled teeth > 0

DMFT

The DMFT is the sum of decayed, missing and filled permanent teeth. The calculation was based on 28 teeth excluding the third molars. Teeth recorded as missing for any reasons other than caries or as un-erupted are not included in the sum. The shape of the distribution of the DMFT index was checked before carrying out the statistical analyses. The frequency histogram showed that data was not normally distributed. Therefore the DMFT was transformed into a categorical variable using the median (value=1) as the cut off point, and coded as:

0- Low (DMFT 0 to 1)

1- High (DMFT >1)

5.9 Data processing and analysis

The Epi Info 2000 software was used to create data entry forms. To minimize mistakes and increase accuracy when entering data, a range of data check commands in the programme such as 'must enter data', 'conditional jumps' and 'legal value' were used. Data were entered twice separately into 2 data files by two independent typists. Data in the two files were compared and any discrepancy showing different values among them was checked and corrected against the data in the original forms/questionnaires. The final files were used in the data analytic process.

The statistical analysis was carried out using SPSS version 10.1 (Statistical Package for Social Sciences Data) and STATA 8.2 software programmes. The first step involved the calculation of all aforementioned clinical and non-clinical variables. Then, the frequency distributions of the variables were assessed using descriptive analyses. Mann-Whitney and Kruskal-Wallis tests were used to test for significant differences in the clinical status between different categories of socio-demographic variables (sex, age, socioeconomic status). Then, associations between the outcome variables and each explanatory variable were explored by Spearman's rank correlations in order to choose appropriated variables to enter the model. In the next stage bivariate associations were initially assessed by Chi-square Tests and simple logistic regression. Lastly the association between the outcome variable and explanatory variables were explored using multiple logistic regression analysis and the best fitted model was built.

5.9.1 Justification of variables entered and stages of model building

As mentioned above the explanatory variables selected for the adjustment were those related to the study objectives. However, socioeconomic status variables

comprised of several measures. Hence, the most appropriate socioeconomic variables were selected for use in the adjusted model.

Measures of socioeconomic status of children included variables such as occupation of parents, educational level of parents and family monthly income. In an attempt to identify the most appropriate socioeconomic status measure for school absence for dental reasons, data were collected on all aforementioned variables. However, there was no clear hierarchy between the different occupational categories in relation to socioeconomic status among this sample. Therefore, occupation of parents was excluded from subsequent multivariate analysis.

Furthermore, before constructing the model for multiple logistic regression, the correlations between the explanatory variables were checked with a correlation matrix (Table 5.4). The analysis showed that father's educational level and mother's educational level were highly correlated (R=0.70) and both were correlated with family income (R=0.57 and 0.55, respectively). This indicated that the inclusion of all those variables in the final model would not be appropriate. Consequently, in order to reduce co-linearity in the adjusted logistic regression analyses and considering that it had the most missing answers (155 people), father's educational level was excluded from further analysis.

Apart from father's educational level, DMFT was also not adjusted for in the model. This is because there were very few missing teeth among children in the study; 0.02 (±0.19) teeth. Also many children were still in the mixed dentitions phase. Therefore, it was more appropriate to adjust for the numbers of decayed teeth and filled teeth that included both deciduous and permanent teeth.

Subsequently, all other variables of interest that were based on findings from the bivariate analyses, had a potential as a confounder were included in further multiple regression analysis. Although sex was not significantly related with the outcome, it was important to explore whether age and sex were associated with

other variables predicting outcomes because it is standard practice to account for the effects of age and sex. Number of filled teeth was kept because its effect on other variables needed to be checked. Therefore, the variables that were used in the multiple logistic regression were age, sex, mother's educational level, family monthly income, school type, dental care payment scheme, parent marital status, number of decayed teeth and number of filled teeth.

The next step in the data analysis was to check for interactions between the variables. No statistically significant interaction terms were found. Thus, there was no need for adding interaction into the analysis.

In the analyses for dental impact on daily performances, despite having only few variables significantly associated with the outcome in the binary analysis, in order to make the analysis consistent with the analysis for school absenteeism for dental reasons, the variables selected and order of variables entered in the model building were identical with the analyses on school absenteeism for dental reasons.

The sequence of stages and order of variables adjusted in each stage of model building is as follows: The preliminary stage of model building after the bivariate analysis is the age-sex adjusted model, where the effect of each variable on the outcome was adjusted for age and sex. Next, the social variables were also entered into the models, with the variables of most interest added first, to explore whether each variable had an effect on the main outcome independent of the other variables and to examine and test confounding effect between the variables. For these social variables, the order of variables entered was based on the interest and the assumed association to the outcome. Firstly, mother's education level and family income were adjusted for, on the main assumption that they would play an important role in predicting school absence for dental reasons. They were entered together because they were considered as socioeconomic status variables. Then school type was added followed by other social variables; dental care payment scheme and parent's marital status. They were adjusted for one at a time so that

any confounding effect of each variable can be clearly identified. Finally, dental health status variables (number of decayed teeth and number of filled teeth) were adjusted for in the fully adjusted model. They were added at the same time because they both express dental health status. The following models were sequentially developed to test hypotheses.

- Model 1 - The unadjusted analyses of each explanatory variable and the outcome variable. This provides the basis for future comparison.
- Model 2 - The standard practice of age-sex adjustment of each explanatory variable and the outcome variable. This model also provides the basis for comparison with other models with more variable adjusted. Age-sex was also kept in all following models.
- Model 3 - The effect of socioeconomic status variables; mother's educational level and family income was further adjusted for.
- Model 4 - The effect of school type was also adjusted for.
- Model 5 - The effect of other social variables were additionally adjusted. Dental care payment scheme was adjusted first followed by parent's marital status.
- Model 6 - This is the full and final model, where the effect of dental health variables was adjusted to fully adjust. In this final model all potential predictors were also adjusted for each other to find the explanatory factors that remained statistically significant after the full adjustment.

Table 5.4: Correlation coefficient of demographic variables, social variables and dental health variables

	R (Spearman's Correlation Coefficient) p-value									
	Father's educational level	**Mother's educational level**	**Family income**	**School type**	**Number of decayed teeth**	**Number of filled teeth**	**Dental care scheme**	**Parent's marital status**	**Sex**	**Age**
Father's educational level										
Mother's educational level	R=0.70 P < 0.001									
Family income	R=0.57 p < 0.001	R=0.55 p < 0.001								
School type	R=-0.29 p < 0.001	R=-0.30 P < 0.001	R=-0.35 p < 0.001							
Number of decayed teeth	R=-0.16 p < 0.001	R=-0.21 p < 0.001	R=-0.14 p < 0.001	R=0.09 p=0.002						
Number of filled teeth	R=0.03 p< 0.28	R=0.06 p=0.07	R=0.03 p=0.34	R=-0.03 p=0.35	R=-0.0001 p=0.99					
Dental care scheme	R=-0.47 p < 0.001	R=-0.46 p < 0.001	R=-0.56 p < 0.001	R=-0.31 p < 0.001	R=0.11 p=0.0002	R=-0.009 p=0.76				
Parent's marital status	R=-0.04 p=0.16	R=-0.02 p=0.57	R=-0.19 p < 0.001	R=0.13 p < 0.001	R=0.03 p=0.29	R=-0.002 p=0.94	R=0.16 p < 0.001			
Sex	R=0.02 p=0.57	R=0.03 p =0.34	R=-0.02 p=0.55	R=0.01 p=0.71	R=-0.05 p=0.07	R=0.04 p=0.13	R=0.03 p=0.27	R=0.02 p=0.52		
Age	R=-0.04 p=0.20	R=-0.02 p=0.45	R=-0.03 p=0.33	R=-0.08 p= 0.008	R=-0.06 p=0.055	R=0.04 p=0.21	R=-0.03 p=0.39	R=0.02 p=0.39	R=-0.02 p=0.58	

CHAPTER 6

GENERAL RESULTS

6 GENERAL RESULTS

This chapter presents the findings on the reliability of clinical data. It encompasses findings on inter-examiner agreement, intra-examiner agreement and the reliability of questionnaires for parents and children. Then findings about the characteristics of sample and general frequency distribution of the variables explored are presented. Data on dental health status and the association between dental health and demographic and social factors of children are then presented. The last section presents data on the amount of time children were absent from school for dental reasons compared to the absence time caused by medical and social reasons.

6.1 Response rate

There were 17 schools whose head teachers agreed to participate in this research. Positive parental consent forms were sent to 1,222 parents; 11 parents refused to take part for reasons such as not having time to complete the questionnaire.

A total of 1,211 children were clinically examined. However, since this study was carried out over one year, there were 11 children who moved to other towns or schools. 1,200 children answered the questionnaire, a response rate of 99.1%. The total number of parents who answered the questionnaire was 1,158, a response rate of 95.7%. 42 parents did not return the questionnaire. Since data analysis required combining and comparing of information from children and parents questionnaires, the number of the sample used for data analysis was 1,158.

6.2 Reliability of clinical data

In the main study, consistency of examination for dental caries was assessed throughout data collection. A total of 122 children were re-examined twice for intra-examiner reliability and 104 children were examined three times by each examiner to test inter-examiner reliability. Cohen's Unweighted Kappa coefficient of agreement was used (Cohen 1960). Interpretation of Kappa values was according to a six-point scale suggested by Landis (1977) (Landis and Koch 1977).

Kappa tests were performed using the tooth as the unit of analysis and considering each tooth separately. Teeth with sealants were assessed separately from sound teeth. The Kappa score for intra-examiner agreement and the inter-examiner agreement was very good (Table 6.1).

Table 6.1: Kappa score for intra-examiner agreement and inter-examiner agreement (n_1=40, n_2=41, n_3=41, n_4=104)

Examiner(s) agreement	Kappa score
Intra-examiner	
Gold standard	0.94
Examiner 1	0.92
Examiner 2	0.98
Inter-examiner	
Gold standard and Examiner 1	0.86
Gold standard and Examiner 2	0.89

6.3 Reliability and validity of self-administered parent/children questionnaire

6.3.1 Reliability of the questionnaire

For assessing test-retest reliability, 127 children and 115 parents were asked to repeat the whole questionnaire about one week after the first one had been completed. All children and parents returned the repeat questionnaire. The overall unweighted kappa for children was 0.91 and for parents, 0.87.

6.3.2 Validity and reliability of simplified Child OIDP index

The psychometric properties of the daily performance items extracted from Child-OIDP index were re-evaluated in the main study. Unweighted kappa was 0.88 indicating excellent reliability. The inter-item correlation matrix shows that all correlations were positive and each item of the index was weakly or moderately correlated with each other (Table 6.2). Internal consistency or homogeneity of the scale was tested to see if items were all measuring the same underlying construct. The Cronbach alpha coefficient for all scales was 0.78 and the standardised alpha was 0.79. The alpha of items did not increase when any specific item was deleted (Streiner and Norman 1995). In addition, corrected item-total correlation, that is the correlation of each item with the total score, were between 0.38 - 0.57 which are very good because they are all above 0.20 (Table 6.2). Furthermore, the overall Alpha if item deleted is lower than the Standardised item alpha which is good. In general, the daily performance items showed good validity and reliability.

Table 6.2: Psychometric properties of the daily performance items from the Child-OIDP index in the main study; Internal reliability analysis: Items Correlation Matrix, Corrected Item-Total Correlation, Alpha, Standardised alpha and Alpha if item deleted (n=1,158)

Performances	1. Eating	2. Speaking	3. Cleaning	4. Sleeping	5. Emotion	6. Smiling	7. Study	8. Social Contact
1. Eating	1.00							
2. Speaking	0.21	1.00						
3. Cleaning	0.30	0.29	1.00					
4. Sleeping	0.24	0.30	0.23	1.00				
5. Maintain emotion	0.27	0.35	0.27	0.27	1.00			
6. Smiling	0.23	0.47	0.33	0.37	0.38	1.00		
7. Study	0.20	0.37	0.26	0.42	0.33	0.42	1.00	
8. Social contact	0.27	0.38	0.25	0.38	0.32	0.39	0.48	1.00

Performances	Corrected Item-Total Correlation	Alpha if item deleted
1. Eating	0.38	0.77
2. Speaking	0.52	0.75
3. Cleaning	0.42	0.77
4. Sleeping	0.47	0.76
5. Maintain emotion	0.47	0.76
6. Smiling	0.57	0.74
7. Study	0.55	0.75
8. Social contact	0.54	0.75
Alpha		0.78
Standardized item alpha		0.79

6.4 Descriptive findings: demographic, social background and dental health status

6.4.1 The demographic and socioeconomic status, school type, parent's marital status of children included in the study

General socio-demographic features of the study population are shown in Table 6.3. One thousand one hundred and fifty eighty children from 17 schools and their parents participated in the study. Of the 1,158 children, 52.5% were males (n=608) and 47.5% were females (n=550). Their ages ranged from 9 to 13 years old; 32.2% (373) were 10 years old, 59.9% (694) 11 years old and 7.4% (86) were 12 years old. Only one child was 9 years old and 4 were 13 years old. The mean age of the children was 10.8 (±0.6) years.

Nearly 50% of children were attending private schools (n=576, 49.7%), 437 (37.7%) attended state schools and only 145 children (12.6%) attended municipal schools. Most fathers (88.3%) and mothers (76.4%) were employed at the time of the study. About 20% of both fathers and mothers had education at degree level. 25% of fathers (n=289) had completed junior-high school to high school, whereas one-third of mothers (32.6%) had only primary education or less. Average monthly income per family in Maung district, Lampang was about 9,759 baht (Office of National Statistics 2003). Family incomes of the children's families in the present study varied from between less than 3,000 baht to above 15,000 baht, one-third of families had monthly income about the average Lampang household income (Office of National Statistics 2003). 34.5% earned 3,001 to 9,000 baht, the rest earned from 3,000 baht or less (14.8%), 9,001-15,000 (14.5%) to more than 15,000 baht (29.8%) a month. Most children were living with one or both of their natural parents. Only 115 (9.9%) children were not. The majority of parent's were co-habiting (935, 80.7%).

6.4.2 General dental care scheme

The general dental care scheme is part of the health care scheme provided by the Thai government. Description and details of general dental care scheme are presented in Chapter 4. Thai children can commonly use it even though they do not go to school at all or go to international schools. There were four groups of children in the present study categorised by the type of general dental care schemes they used. These are;

- children eligible for the Thai government health care scheme "Children 0-15 years-old Health Care Scheme" (n=445, 35.3%).
- children who had dental care scheme which was part of their parents' health welfare scheme provided by parent's workplaces (n=408, 38.4%).
- children whose parents paid privately (n=210, 18.1%).
- unknown (n=95, 8.2%) (Figure 6.1).

6.4.3 School Dental Service (SDS)

All 1,158 children selected for the study were eligible for the School Dental Service (SDS). However not all received treatment under the SDS. A description and details of the School Dental Service provision are presented in Chapter 4.

All children received a dental screening from the SDS. However, only 440 (38%) children were eligible for dental treatment from the SDS (Figure 6.2). Children who were eligible for dental treatment from the SDS consisted of:

- 291 children who used the "Children 0-15 years-old Health Care Scheme",
- 46 children covered under parents' welfare from workplaces,
- 53 children whose parents normally pay privately (out of pocket) for their dental care,
- 50 children who did not provide information on their general dental care scheme (Figure 6.3).

The criteria for children to receive dental treatment from the SDS depends on the school that the children are attend, not the general dental care scheme they are using. These 440 children were eligible for dental treatment from SDS because they were studying at the schools for which dental treatment by the SDS is provided irrespective of the way they paid for treatment. These schools are all municipal schools and most of the state schools. A few large state schools located in the city centre are not included in the SDS dental treatment provision. The remaining 718 children were eligible for dental screening only but not the dental treatment from the SDS because they were studying at schools for which dental treatment by the SDS is not provided. These schools are all private schools and some large state schools located in city centres. The reason for not being eligible is the current shortage of manpower and it is also assumed that parents of children in these schools have the potential and preferences to take their children to visit dentists on their own (Figure 6.4).

Table 6.3: Distribution of children included in the study; Lampang, Thailand

Socio-demographic variables	Frequency	Relative frequency (%)
Sex		
Male	608	52.5
Female	550	47.5
Age (years)		
9	1	0.1
10	373	32.3
11	694	59.9
12	86	7.4
13	4	0.3
School type		
Private	576	49.8
State	437	37.7
Municipal	145	12.5
Father's employment		
Unemployed	15	1.3
Employed	1022	88.3
Unknown	121	10.4
Mather's employment		
Unemployed	211	18.2
Employed	883	76.3
Unknown	64	5.5
Father's educational level		
Primary school or less	270	23.3
Junior –high school	289	24.9
Vocational	244	21.1
Degree level	238	20.6
Unknown	117	10.1
Mother's educational level		
Primary school or less	378	32.6
Junior –high school	264	22.8
Vocational	202	17.4
Degree level	231	20.0
Unknown	83	7.2
Family income (baht)		
3,000 or less	171	14.8
3,001-9,000	400	34.5
9,001-15,000	168	14.5
15,001 or more	345	29.8
Unknown	74	6.4
Dental care scheme		
Parents' health welfare scheme or paid privately	618	53.4
Thai government health care scheme	445	38.4
Unknown	95	8.2
Parent marital status		
Both parents	935	80.7
Single parents	182	15.7
Unknown	41	3.6

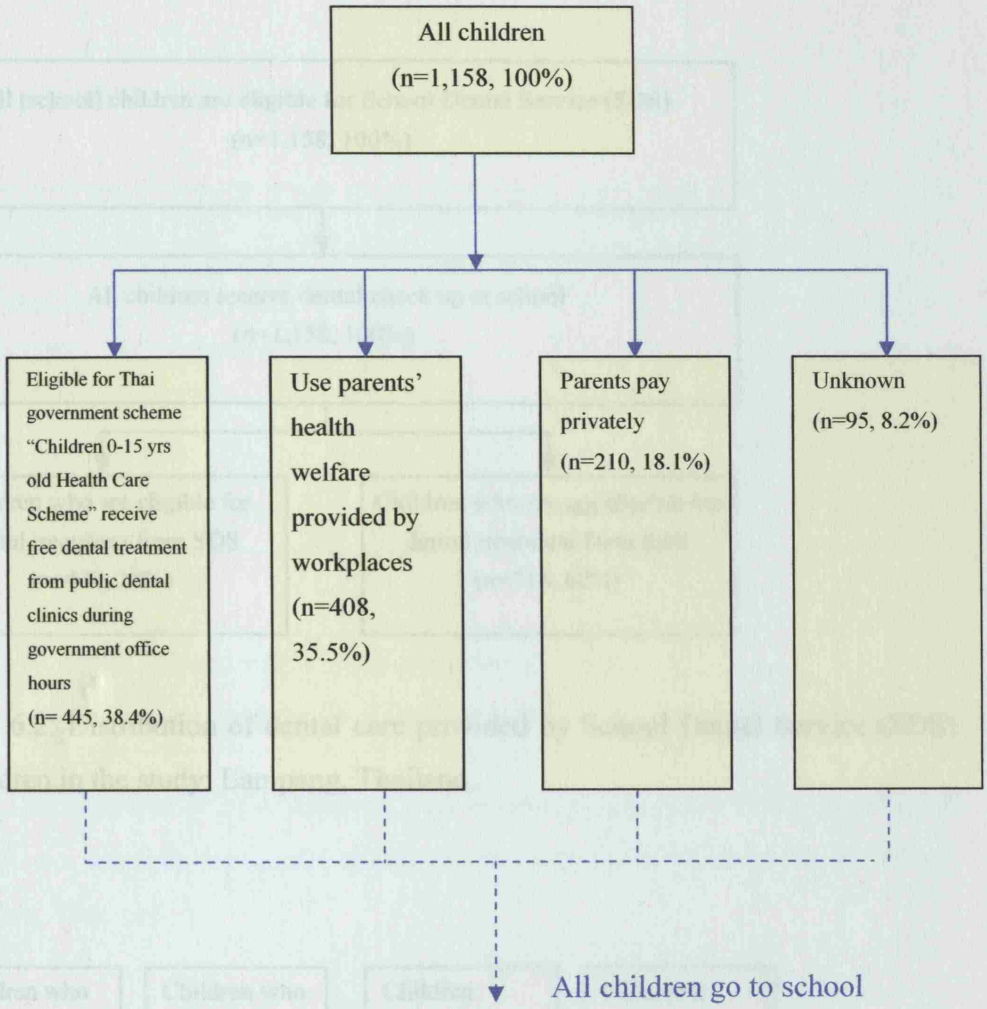


Figure 6.1: Distribution of general dental care scheme for Thai children provided by Thai government in children in the study; Lampang, Thailand.

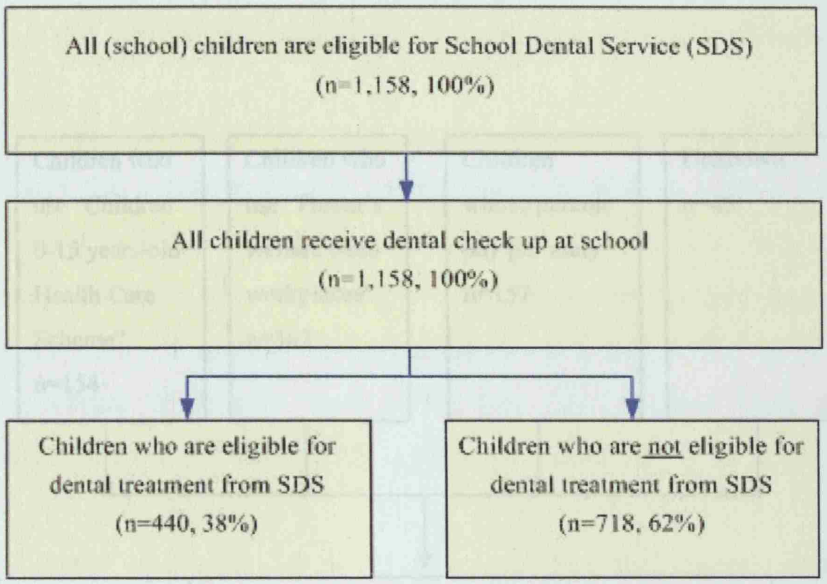


Figure 6.2: Distribution of dental care provided by School Dental Service (SDS) in children in the study; Lampang, Thailand.

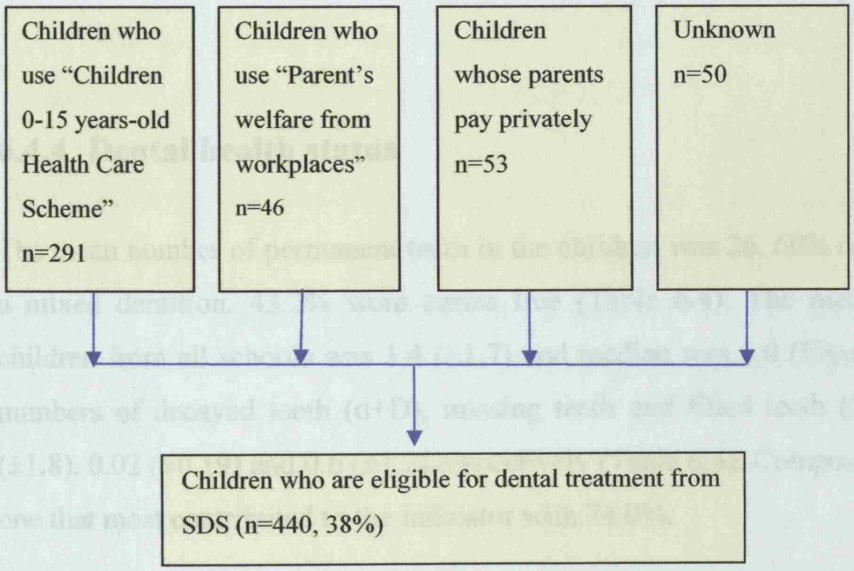


Figure 6.3: Distribution of children in each general dental care scheme in group of children eligible for dental treatment from SDS in children in the study; Lampang, Thailand.

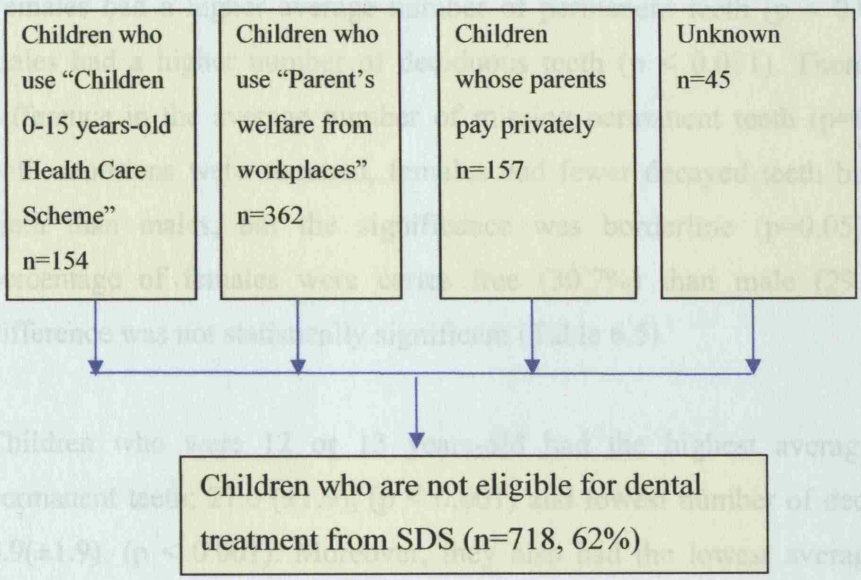


Figure 6.4: Distribution of children in each general dental care scheme in group of children not eligible for dental treatment from SDS in children in the study; Lampang, Thailand.

6.4.4 Dental health status

The mean number of permanent teeth in the children was 26. 60% of children had a mixed dentition. 43.2% were caries free (Table 6.4). The mean DMFT for children from all schools was 1.4 (±1.7) and median was 1.0 (Figure 6.5). Mean numbers of decayed teeth (d+D), missing teeth and filled teeth (f+F) were 1.4 (±1.8), 0.02 (±0.19) and 0.6 (±1.2) respectively (Table 6.4). Component D was the one that most contributed to the indicator with 74.0%.

6.4.4.1 Dental health status, by sex, age and school type

Females had a higher average number of permanent teeth ($p < 0.001$) whereas males had a higher number of deciduous teeth ($p < 0.001$). There was no sex difference in the average number of missing permanent teeth ($p=0.854$). When both dentitions were summed, females had fewer decayed teeth but more filled teeth than males, but the significance was borderline ($p=0.057$). A higher percentage of females were caries free (30.7%) than male (29.4%) but the difference was not statistically significant (Table 6.5).

Children who were 12 or 13 years-old had the highest average number of permanent teeth; 27.0 (±1.9), ($p < 0.001$) and lowest number of deciduous teeth; 0.9(±1.9), ($p < 0.001$). Moreover, they also had the lowest average number of decayed teeth; 1.3 (±1.8), $p=0.017$. The mean DMFT ranged from 1.2 (±1.4) for 9-10 year-olds, 1.4 (±1.7) for 11 year-olds and 1.8 (±2.2) for 12-13 year-olds and the percentage of caries free children ranged from 28.3%, 30.4% and 34.4% from the youngest group to the oldest group. Furthermore, the 12-13 year-olds had the highest average number of missing teeth as well as filled teeth but these differences are not statistically significant (Table 6.5).

Significant differences in dental status were found when school type was considered. Children who were studying in private schools had the least decayed teeth; 1.30 (±1.82) and the lowest average number of missing teeth; 0.01(±0.1) compared with children attending state or municipal schools ($p=0.003$, $p=0.006$, respectively) (Table 6.5).

Children at state schools children had a mean DMFT of 1.5 (±1.8) whereas those in municipal schools had mean DMFT of 1.6 (±1.8), private school children had the mean DMFT of 1.3 (±1.7). The highest percentage of caries free children was found in private schools (32.5%), whereas the state school children and municipal school children had lower percentage of caries free children; 28.8% and 24.1%, respectively. The highest average number of filled teeth was reported among

private school children; 0.7 (±1.2) but children in state and municipal schools had similar levels of filled teeth; 0.6 (±1.2) and 0.6 (±1.1) respectively (Table 6.5). However, the differences were not statistically significant.

6.4.4.2 Dental health status, by father's educational level, mother's educational level, family income

One of the objectives of this study was to investigate whether children from higher socioeconomic status families had better dental health status. Children from higher socioeconomic status had better oral health status than children from lower socioeconomic status families.

Considering parent's educational level, Children who had a father with degree level education and those who had a degree level educated mother, had the lowest average number of decayed teeth and the lowest mean DMFT and the highest proportion of caries-free. Children of degree educated fathers had average number of decayed teeth of 0.9 (1.40), $p < 0.001$ and mean DMFT 1.1 (±1.6), p=0.002. Whereas children who had degree level educated mother had an average number of decayed teeth of 0.8 (±1.22) and mean DMFT of 1.0 (±1.4), $p < 0.001$. The highest percentage of caries free children were in group who had degree level educated fathers; 39.1%, $p< 0.001$ or mothers; 43.3%, $p < 0.001$. A higher percentage of children from higher income families had better oral health status. Children living in more affluent families (income above 15,000 baht) had the lowest average number of decayed teeth; 1.2 (±1.75), $p < 0.001$ and a mean DMFT of 1.2 (±1.6), p=0.001 (Table 6.6). Furthermore, 35.4% of children from families in the highest income group (income above 15,000 baht) were caries free compared to 22.2% among those from families with the lowest income p=0.012. In addition, this group of children also had the least average number of permanent teeth; 24.9 (±3.45). p=0.031, the most average number of deciduous teeth; 3.1 (±3.45). p=0.031 (Table 6.6).

6.4.5 Dental pain and experiencing of dental problems

Most of the children (92.3%) had experienced dental pain or dental problems at least once in their lifetime. Dental pain or dental problems in the past 1 month occurred in 14% (n=162) of children, while 80.8% (n=936) did not have such problems. The rest of the children could not remember (5.2%).

Table 6.4: Dental status of school children in the study; Lampang, Thailand

Dental health variables	Frequency	Relative frequency (%)
Number of decayed teeth (D)		
0	700	60.5
1	234	20.2
>1	224	19.3
Number of filled teeth (F)		
0	843	72.8
1	133	11.5
>1	182	15.7
Number of missing teeth (M)		
0	1,136	98.10
1	18	1.55
>1	4	0.35
DMFT		
0	503	43.44
1-2	423	36.53
≥ 3	232	20.03
Number of decayed teeth (D+d)		
0	500	43.2
> 0	658	56.8
Number of filled teeth (F+f)		
0	806	69.6
> 0	352	30.4
Number of caries free children (all school)		
Yes	500	43.2
No	658	56.8
Number of caries free children by school type		
Private school	187	32.5
State school	126	28.2
Municipal school	35	24.1
Number of children with mixed dentition		
Mixed dentition	695	60.0
Non-mixed dentition	463	40.0

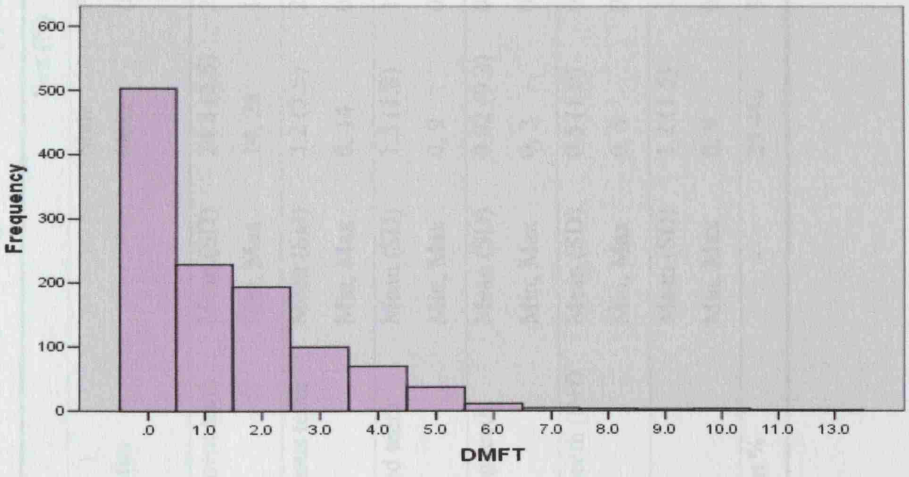


Figure 6.5: Frequency distribution of DMFT.

Table 6.5: Dental status, by sex, age and school type, of children in the study; Lampang, Thailand; Mean (SD) Min, Max

		Sex (N)			Age (N)				School type (N)			
Dental health status		**Male (608)**	**Female (550)**	**p-value**	**9-10 years (374)**	**11 years (694)**	**12-13 years (90)**	**p-value**	**Private school (576)**	**State schools (437)**	**Municipal schools (145)**	**p-value**
Number of permanent teeth	Mean (SD)	24.8 (3.5)	25.9 (3.0)	<0.001	24.2 (3.6)	25.6 (3.1)	27.0 (1.9)	<0.001	25.3 (3.4)	25.3 (3.2)	25.3 (3.4)	0.882
	Min, Max	14, 28	14, 28		14, 28	14, 28	17, 28		14, 28	14, 28	16, 28	
Number of deciduous teeth	Mean (SD)	3.2 (3.5)	2.1 (3.0)	<0.001	3.8 (3.6)	2.3 (3.1)	0.9 (1.9)	<0.001	2.7 (3.4)	2.7 (3.2)	2.7 (3.4)	0.882
	Min, Max	0, 14	0, 14		0, 14	0, 14	0, 11		0, 14	0, 14	0, 12	
Number of decayed teeth	Mean (SD)	1.5 (1.8)	1.4 (1.9)	0.066	1.7 (2.0)	1.3 (1.7)	1.3 (1.8)	0.017	1.3 (1.8)	1.5 (1.8)	1.7 (1.9)	0.003
(D+d)	Min, Max	0, 9	0, 12		0, 12	0, 12	0, 7		0, 12	0,12	0, 12	
Number of missing teeth	Mean (SD)	0.02 (0.2)	0.02 (0.2)	0.854	0.02 (0.1)	0.02 (0.2)	0.05 (0.3)	0.551	0.01 (0.1)	0.03 (0.2)	0.08 (0.4)	0.006
	Min, Max	0, 3	0, 3		0, 1	0, 3	0, 3		0, 2	0 ,2	0, 3	
Number of filled teeth (F+f)	Mean (SD)	0.5 (1.0)	0.7 (1.3)	0.057	0.5 (1.1)	0.7 (1.2)	0.8 (1.3)	0.301	0.7 (1.2)	0.6 (1.2)	0.6 (11)	0.587
	Min, Max	0, 5	0, 8		0, 5	0, 8	0, 6		0, 6	0, 8	0, 4	
Mean DMFT	Mean (SD)	1.2 (1.5)	1.5 (1.9)	0.075	1.2 (1.4)	1.4 (1.7)	1.8 (2.2)	0.061	1.3 (1.7)	1.4 (1.7)	1.6 (1.8)	0.281
	Min, Max	0, 9	0, 13		0, 9	0, 13	0, 10		0, 11	0, 13	0, 8	
caries free children %	-	29.4%	30.7%	0.634	28.3%	30.4%	34.4%	0.500	32.5%	28.8%	24.1%	0.116

Table 6.6: Dental status, by socioeconomic status, of children in the study; Lampang, Thailand; Mean (SD) Min, Max

		Father's educational level					Mother's educational level					Family income (Baht)				
Dental health status		Primary	Secondary	Vocational	Degree	p-value	Primary	Secondary	Vocational	Degree	p-value	3000 or less	3,001-9,000	9,001-15,000	>15,000	p-value
Number of permanent teeth	Mean	25.6	25.4	25.1	25.2		25.5	25.6	25.1	25.1		25.2	25.6	25.4	24.9	
	(SD)	(3.17)	(3.31)	(3.45)	(3.35)	0.269	(3.27)	(31.3)	(3.38)	(3.39)	0.281	(3.26)	(31.6)	(3.22)	(3.45)	0.031
	Min, Max	14, 28	14, 28	16, 28	16, 28		14, 28	14, 28	16, 28	16, 28		16, 28	14, 28	14, 28	16, 28	
Number of deciduous teeth	Mean	2.4	2.6	2.9	2.8		2.5	2.4	2.9	2.9		2.7	2.4	2.6	3.1	
	(SD)	(3.17)	(3.31)	(3.45)	(3.35)	0.269	(3.27)	(3.13)	(3.38)	(3.39)	0.281	(3.26)	(3.16)	(3.22)	(3.45)	0.031
	Min, Max	0, 14	0, 14	0, 12	0, 12		0, 14	0, 14	0, 12	0, 12		0, 12	0, 14	0, 14	0, 12	
Number of decayed teeth (D+d)	Mean	1.9	1.5	1.2	0.9		1.9	1.4	1.4	0.8		2.1	1.4	1.4	1.2	
	(SD)	(2.04)	(1.86)	(1.76)	(1.40)	<0.001	(2.02)	(1.79)	(2.04)	(1.22)	<0.001	(2.39)	(1.59)	(1.79)	(1.75)	<0.001
	Min, Max	0, 11	0, 10	0, 12	0, 7		0, 12	0, 10	0, 12	0,7		0, 12	0, 9	0, 11	0, 12	
Number of missing teeth	Mean	0.03	0.02	0.004	0.02		0.03	0.03	0.01	0.02		0.03	0.02	0.01	0.02	
	(SD)	(0.23)	(0.17)	(0.06)	(0.17)	0.360	(0.22)	(0.22)	(0.12)	(0.21)	0.770	(0.17)	(0.19)	(0.11)	(0.17)	0.491
	Min, Max	0, 3	0, 2	0, 1	0, 2		0, 3	0, 3	0, 1	0, 2		0, 1	0, 3	0, 1	0, 2	
Number of filled teeth (F+f)	Mean	0.55	0.62	0.59	0.76		0.54	0.58	0.76	0.75		0.68	0.50	0.60	0.77	
	(SD)	(1.11)	(1.08)	(1.16)	(1.32)	0.330	(1.06)	(1.07)	(1.33)	(1.30)	0.150	(1.19)	(1.04)	(1.08)	(1.33)	0.020
	Min, Max	0, 8	0, 5	0, 7	0, 6		0, 8	0, 5	0, 7	0, 5		0, 8	0, 7	0, 5	0, 6	
Mean DMFT	Mean	1.7	1.3	1.2	1.1		1.6	1.3	1.5	1.0		1.8	1.3	1.3	1.2	
	(SD)	(1.9)	(1.5)	(1.6)	(1.6)	0.002	(1.8)	(1.6)	(1.9)	(1.4)	<0.001	(2.1)	(1.5)	(1.7)	(1.6)	0.001
	Min, Max	0, 11	0, 10	0, 9	0, 10		0, 13	(0, 10)	0, 11	0, 8		0, 13	0, 10	0, 11	0, 10	
% caries free children	-	23.3	26.9	34.0	39.1	<0.001	21.4	31.4	29.7	43.3	<0.001	22.2	27.8	32.1	35.4	0.012

6.5 Descriptive findings: School absence

In this study, school absence is the main outcome under investigation and data were collected from two sources;

1) daily school attendance assessed for one school year.

2) time record sheets for time spent having dental care by the School Dental Service (SDS).

6.5.1 School absence recorded on daily school attendance forms for one school year

School absence by the 1,158 study children were recorded for every school day for one school year using daily attendance forms specially designed for this study. The reasons for absences were collected under five main headings:

1) Dental appointment
2) Oral pain
3) Medical appointment
4) Medical illnesses
5) Social reasons

The prevalence of school absence and school hours absent recorded in the school attendance records are shown in Table 6.7. They show that:

1. Not many children went to private dentists for appointments during school time. Consequently, of the 1,158 children who had their school attendance recorded for 1 year, there were 32 school absences caused by private dental appointments. That accounted for 117 hours of school time loss.
2. While there were not many cases of oral pain (6 cases), they accounted for 42 hours of school absence.
3. Even though the prevalence of school absence for medical appointments (23) was lower than the number of school absences for dental

appointments, the medical appointments caused more school hours absence, 181 hours.

4. Medical illnesses caused the highest prevalence of school absenteeism and most school hours absent. There were a total of 1,052 absences due to medical illnesses resulting in 9,700 hours of school absence.
5. Social reasons were also a major cause of school absence. They accounted for 438 school absences and amounting to 4,191 school hours absent.
6. When the absence figures from all reasons were added up over 1 year, the 1,158 children in this study had 1,551 school absences and missed 14,231 hours of school time.

School absenteeism for each reason per 1,000 children is presented in Table 6.7. Of the total recorded from daily attendance forms, dental reasons accounted for 139 hours of school absences and medical reasons caused 8,534 hours whereas social reasons caused 3,620 hours. That does not include the time to have dental screening and treatment from School Dental Service (SDS).

Table 6.7: Prevalence of school absence and school hours lost recorded on daily school attendance reports for one school year for dental, medical, social reasons; of children in Lampang, Thailand

Reasons for absence	Number of school absences	School time absent per 1,158 children (hours)	School time absent per 1,000 children (hours)
Dental appointment	32	117	102
Oral pain	6	42	37
Total dental reasons	38	159	139
Medical appointment	23	181	157
Medical illnesses	1,052	9,700	8,377
Total medical reasons	1,075	9,881	8,534
Social reason	438	4,191	3,620
Total social reasons	438	4,191	3,620
Total	1,551	14,231	12,293

6.5.2 School absence due to dental screening and dental treatment from the School Dental Service

The school time absence for School Dental Service is presented in two separate parts according to the type of activity by the School Dental Service.

- dental screening,
- dental treatment [†]

The school time for dental screening and dental treatment was divided into:

1) the time absent due to travelling between school and dental clinic,
2) waiting at clinic for screening or treatment and for going back to school,
3) dental care time - dental screening, dental treatment

6.5.2.1 School absence for SDS dental screening

For dental screening, travelling time from classrooms to dental clinics and from dental clinics back to classrooms accounted for 2,729 minutes whereas the waiting time was 9,398 minutes school time loss. Dental screening for the children took 181 minutes. The average time of school absence on the dental screening day per child was, 3 minutes for travelling, 8 minutes for waiting and an average of 10 seconds per child for dental screening - an average of 11 minutes or one-fifth of a school period per child per year (Table 6.8).

When converting the school time spent for dental screening provided by School Dental Service to hours per 1,000 children, the 1,000 children were absent for 179 hours or about 30 school days (1 school day was 6 hours) per year.

[†] Dental treatment includes oral examination

6.5.2.2 School absence for SDS dental treatment

For dental treatment, travelling time from classrooms to dental clinics and from dental clinics back to classrooms accounted for 3,207 minutes whereas the waiting time was 15,847 minutes school time loss. Dental treatment for the children having treatment took 1,430 minutes. The average time of school absence on the dental treatment day per child was, 2.77 minutes for travelling, 13.68 minutes for waiting and an average of 1.23 minutes per child for dental treatment.

When converting the absence time for dental treatment provided by School Dental Service to hours per 1,000 children, children were absent for 295 hours or about 50 school days (1 school-day was 6 hours) or for on average of 0.30 hours (18 minutes) or more than one-third of a school class per child per year (Table 6.9).

There were only 233 children (20.1%) who actually attended for dental treatment, therefore the actual average burden of school absence on each of them was 14 minutes for travelling, 68 minutes for waiting time and 6.30 minutes on the dental treatment.

6.5.2.3 School absence for SDS dental care; dental screening and dental treatment

When considered time spent for dental care provided by School Dental Service including dental screening and dental treatment, each year this group of children spent 32,792 minutes or 547 hours for dental screening and dental treatment or 28,319 minutes or 474 hours per 1,000 children, or about 29 minutes per child per year.

Travelling time from classroom to dental clinics and from dental clinics back to classrooms accounted for 5,936 minutes whereas the waiting time was 25,245 minutes school time loss. Dental care for the children took 1,611 minutes. The

average time of school absence for dental care by SDS was, 9 minutes for travelling, 37 minutes for waiting and an average of 1.4 minutes per child for dental care.

When converting the absence time to hours per 1,000 children for dental care provided by School Dental Service including both dental screening and dental treatment, children were absent for 474 hours or about 79 school days or for on average of 0.48 hours (29 minutes) or more than half of a school class per child per year (Table 6.10).

Table 6.8: School time absent for School Dental Service care; dental screening only per one school year of children in Lampang, Thailand

School dental service	Per 1,158 children		Per 1,000 children	
	School time absent (minutes)	School time absent (hours)	School time absent (minutes)	School time absent (hours)
Travelling	2,729	46	2,357	40
Waiting	9,398	157	8,116	136
dental screening	181	3	157	2.6
Total	12,308	206	10,629	178.6

Table 6.9: School time absent for School Dental Service care; dental treatment only per one school year of children in Lampang, Thailand

School dental service	Per 1,158 children		Per 1,000 children	
	School time absent (minutes)	School time absent (hours)	School time absent (minutes)	School time absent (hours)
Travelling	3,207	53	2,770	46
Waiting	15,847	264	13,685	228
Dental treatment†	1,430	24	1,235	21
Total	20,484	341	17,690	295

Table 6.10: School time absent for School Dental Service care; dental screening and dental treatment per one school year of children in Lampang, Thailand

School dental service	Per 1,158 children		Per 1,000 children	
	School time absent (minutes)	School time absent (hours)	School time absent (minutes)	School time absent (hours)
Travelling	5,936	99	5,127	86
Waiting	25,245	421	21,801	364
Dental screening and dental treatment	1,611	27	1,392	24
Total	32,792	547	28,319	474

6.5.3 School absence for all dental reasons recorded in daily school attendance records and for dental care received from School Dental Service (SDS) for one school year

The school absence time due to all dental reasons excluding dental screening among 1,158 children was 341 hours lost to attend the School Dental Service and 159 hours lost for dental appointments and oral pain recorded in daily school attendance register (Table 6.11). This amounts to a total of 500 school hours absent per 1,158 children or 434 hours per 1,000 children with an average of 0.43 hours (26 minutes) per child. Among 260 who had missed hours, they missed school for 1.9 hours per child per year.

However if time spending on dental screening is included, each year this group of children spend 706 hours for dental care and dental treatment per 1,158 children or 613 hours per 1,000 children with an average of 37 minutes per child per year (Table 6.12).

Table 6.11: School time absent due to all dental reasons recorded in daily school attendance register and dental treatment provided by School Dental Service for one school year of children in Lampang, Thailand

School absence recorded	Per 1,158 children	Per 1,000 children
	School time absent (hours)	School time absent (hours)
Daily school attendance (dental appointments, oral pain)	159	139
School Dental Service treatment	341	295
Total	500	434

Table 6.12: School time absent due to all dental reasons recorded in daily school attendance register and all dental care (dental screening and dental treatment) provided by School Dental Service for one school year of children in Lampang, Thailand

School absence recorded	Per 1,158 children	Per 1,000 children
	School time absent (hours)	School time absent (hours)
Daily school attendance (dental appointments, oral pain)	159	139
Dental screening at school and School Dental Service treatment	547	474
Total	706	613

6.5.4 Comparison of school absence for dental, medical and social reasons during one school year and overall school absence per year

The overall school absence time for all reasons included dental, medical and social reasons among 1,158 children during one school year was 14,572 hours or 12,588 hours per 1,000 children (Table 6.13) with an average of 12.6 hours or approximately 2 school days per child per school year.

When comparing all school absences caused by each main reason; dental, medical and social reasons, the majority of school time lost was caused by medical reasons, followed by social reasons; the least was caused by dental reasons. Medical reasons accounted for 9,881 hours lost per year or about 1.5 days (8.5 hours) per child per year. Social reasons also caused the substantial amount of school time loss; 4,191 hours per year or half a day (3.6 hours) per child per year. Dental reasons accounted for the least amount of school time loss; 706 hours, equivalent to 37 minutes (0.61 hours) per child per year or 500 hours, equivalent to 26 minutes (0.43 hours) per child per year if dental screening is excluded. In total, medical reasons, social reasons, and dental reasons caused 8,534 hours, 3,620 hours and 613 (or 434 hours) of school lost, respectively, per 1,000 children per year.

School absence for SDS dental care is presented as school absence with and without dental screening to provide overall information of total time children spent for all dental activities and dental care. However, the absence time for dental screening is not used in further analysis, since it was part of the school curriculum. Dental screening was carried out on a class level with every child receiving it. Furthermore, it was included in the school time schedule, hence all children in a class attended for dental screening at a specific school hour without missing any teaching or other school activity during that time. In contrast, school absence due to oral condition or for dental care appointments resulted in children missing teaching or other school activities at that time.

Table 6.13: Comparison of school time absent occurring during one school year for dental, medical and social reasons of children in Lampang, Thailand

School absence recorded	Per 1,158 children	Per 1,000 children
	School time absent (hours)	School time absent (hours)
Dental reasons		
-Including dental screening	706	613
-Excluding dental screening	500	434
Medical reasons	9,881	8,534
Social reasons	4,191	3,620
Total	14,572	12,588

6.6 Summary

In summary, the main results of general findings were:

6.6.1 Dental health status

Children in this study had low dental caries levels. The mean DMFT was 1.4 and 43.2% of children were caries free. The decayed (d+D) component was 1.4. Children from lower social class families had significantly poorer dental health than other socioeconomic status group. Children who studied at municipal schools had poorer dental health than those at private or state schools.

6.6.2 Time absent from school

The findings partially support *Hypothesis 1*; that the prevalence of school absence and school time loss for dental conditions and dental care among Grade 5 primary schoolchildren in Maung district, Lampang will be high. The school time loss for dental reasons was low per child but high cumulatively. But the findings reject *Hypothesis 2* of the study namely that the prevalence of school absence and

school time loss for dental conditions and dental care will be higher for dental conditions and dental care than for medical reasons) among Grade 5 primary schoolchildren in Maung district, Lampang. However, the findings in this chapter answered the following objectives of the study;

Objective 1 - To calculate the number of school hours missed due to dental reasons per 1,000 Grade 5 primary schoolchildren in one school year.

- Per 1,000 children, dental reasons caused 434 hours of school lost per year or 613 hours including dental screening.
- Per 1,000 children, dental screening provided by School Dental Service caused about 179 hours of school time lost per year; travelling time accounted for 40 hours, waiting time for treatment for 136 hours and dental screening time for 3 hours.
- Per 1,000 children, dental treatment provided by School Dental Service caused 295 hours of school lost per year; travelling time accounted for 46 hours, waiting time for treatment for 228 hours and dental treatment time for 21 hours.
- Per 1,000 children, private dental appointment cause 102 hours of school time lost and dental pain caused 37 hours.

Objective 2 – To investigate the difference in school hours missed due to dental reasons and all other reasons per 1,000 Grade 5 primary schoolchildren in one school year.

- Dental reasons caused much lower school absences than other reasons. The main reason for school absence was medical reasons followed by social reasons and lastly dental reasons.
- In the 1,158 children, medical reasons accounted for 9,881 hours, social reasons for 4,191 hours and dental reasons for 500 hours (or 706 hours including dental screening), of school time lost per year.

- In 1,000 children, medical reasons, social reasons, and dental reasons caused 8,534 hours 3,620 hours and 434 hours (or 613 hours including dental screening), of school time lost per year.
- Per child per year, medical reasons accounted for about 1.5 days (8.5 hours) per child per year, social reasons caused half a day (3.6 hours) whereas, dental reasons accounted for the least amount of school time loss, 26 minutes (0.43 hours) per child (or 37 minutes (0.61 hours) including dental screening).

CHAPTER 7

FACTORS ASSOCIATED WITH SCHOOL ABSENCE FOR DENTAL CONDITIONS AND DENTAL CARE

7 FACTORS ASSOCIATED WITH SCHOOL ABSENCE FOR DENTAL REASONS

In this chapter, the main outcome of this study, school absence for dental reasons, is explored in further detail. All types of school absences due to dental reasons were combined. They included absence for private dental appointments and oral pain recorded in school attendance forms as well as absence to attend for dental treatment in the School Dental Service (SDS).

7.1 The association between explanatory variables and school absence for dental reasons: Bivariate analysis

An investigation of the influence of explanatory variables on the outcomes for this study was conducted. These variables included demographic variables (age, sex), social variables comprised; socioeconomic status variables (father's educational level, mother's educational level, family income), school type, dental care scheme and parent's marital status, and dental health status (number of decayed teeth and number of filled teeth).

First, the association between school absence due to dental reasons and the explanatory variables was explored using the Chi-square test. Of the demographic variables, only age was statistically related to school absence ($p=0.026$). Of those who were 11 years old, 23.6% were absent from school compared with 11% of 12-13 years old. All social variables were highly statistically related with school absence for dental reasons ($p < 0.001$). A higher proportion of children whose parents had higher level of education were less likely to miss school than their peers whose parents had a lower education level. Children whose mothers had primary level education were more frequently absent from school due to dental reasons than those whose parents were educated at degree level; 42.1% and 3.9%

respectively ($p < 0.001$). The proportions by father's education were 44.8% and 5.5% respectively ($p < 0.001$) (Table 7.1).

Children from the lowest family income group had the highest prevalence of school absence (49.1%) compared with 5.5% of those whose family had an income more that 15,000 baht. A higher proportion of children missing school were children having a single parent; 33% whereas 20% of those living with co-habiting parents were absent. School type was highly associated with school absence for dental reasons ($p < 0.001$). The highest proportion of children missing school for dental reasons was children studying at municipal schools (69.7%) whereas 35.2% were from state schools. The lowest proportion was children attending private schools (0.9%). Children who were using Thai government dental care scheme had higher prevalence of school absence (39.8%) compared with 8.6% of those using parents' health welfare scheme or paid privately (Table 7.1).

Number of decayed teeth ($p < 0.001$) and DMFT ($p=0.025$) were the dental health variables that were related with the prevalence of school absence due to dental reasons. Among children who had decayed teeth, 27.7% were absent from school compared to only 15.6% of children who had no decayed teeth. A lower proportion of children with low DMFT (≤ 1) were absent from school for dental reasons; 20.4% compared to 26.1% among children who had a higher DMFT (Table 7.1).

Bivariate logistic regression was then used to better explore the relationships between outcomes and each category of the possible predictive variables and also as a first step before model building for the adjusted logistic regression in the next step.

Results showed that except for sex and number of filled teeth, most variables; age of children, education of parents, family income, parents' marital status and number of decayed teeth were significantly associated with school absence for

dental reasons (Table 7.2). Children aged 12-13 years were less likely to miss school than the younger age groups (OR=0.41, 95%CI =0.20 to 0.84, p=0.015). Children whose fathers were educated to degree level were substantially less likely to have school absence, compared to those with primary level educated fathers (OR=0.07, 95%CI =0.04 to 0.13, $p < 0.001$). That was similar for mother's education (OR=0.05, 95%CI =0.02 to 0.11, $p < 0.001$). When family income was considered, children who were in a family with higher monthly income had considerably lower probability of school absence than those who were in a lower monthly income family (OR=0.06, 95%CI =0.03 to 0.10, $p < 0.001$, for highest compared to lowest income group). The likelihood of school absence for all dental reasons among children who had a single parent was higher (2 times) compared to those living with co-habiting parents (OR=2.00, 95%CI =1.41 to 2.83, $p = 0.016$).

Patterns of association between school absence for dental reasons and school type, dental care scheme and the number of decayed tooth are shown in Table 7.2. Children who studied at municipal schools were significantly more likely to be absent for dental reasons (OR=4.21, 95%CI =2.81 to 6.32, $p < 0.001$) compared to those in state schools whereas private school children were significantly less likely to be absent for dental reasons (OR=0.02, 95%CI =0.006 to 0.04, $p < 0.001$). Also, the children who used Thai government health care scheme were about 7 times more likely to miss school for dental reasons compared to those who used other schemes (OR=7.04, 95%CI =5.01 to 9.88, $p < 0.001$). Children having decayed teeth were about 2 times more likely to be absent from schools compared to those who had no decayed teeth (OR=2.06, 95%CI =1.53 to 2.78, $p < 0.001$) (Table 7.2).

7.2 The association between explanatory variables and school absence for dental reasons: multiple logistic regression analysis

7.2.1 Associations of school absence for dental reasons with explanatory variables: multiple logistic regression analysis

In the unadjusted analysis, most variables were significantly associated with the prevalence of school absence for dental reasons. However the strength of each variable on predicting the school absence due to dental reasons was not clear because of the collinearity caused by the fact that those variables might be correlated with each other (Spearman's correlation, p-value < 0.001). Also, it is important to assess the effect of socioeconomic status variables, school type, other social variables and dental health status on school absenteeism after adjusting for each other. Hence, the next step was to carry out a multiple regression analysis adjusting for demographic variables, social variables and dental health status.

7.2.1.1 Effects of all explanatory variables on school absenteeism for dental reasons: adjusted for age and sex

The explanatory variables were adjusted for age and sex (Table 7.3). Results show that the effect of social variables namely parent's educational level, family income, school type, dental care scheme and parent's marital status on school absence due to dental reasons retained their strength after adjusting for age and sex.

Children aged 12-13 years were least likely to miss school than the younger age groups (OR=0.41, 95%CI =0.20 to 0.84, p=0.015). Children whose fathers had a degree level education were less likely to have school absence when compared to primary level or less educated fathers groups (OR=0.06, 95%CI =0.03 to 0.12, p < 0.001). That was similar for the mother's education (OR=0.05, 95%CI =0.03 to

0.12, p < 0.001). When family monthly income was considered, there was 95% reduction in the odds of being absent from school among children who were in a family with higher monthly income (OR=0.05, 95%CI =0.03 to 0.10, p < 0.001) than those who were in the family with lower income. School absence among children who had a single parent was nearly 2 times higher compared to children with co-habiting parents (OR=1.96, 95%CI =1.38 to 2.78, p < 0.001). Children who used Thai government dental care scheme were very much more likely (7 times) to have been absent from school for dental reasons (OR=7.07, 95%CI =5.03 to 9.95, p < 0.001) than children who used parents' health welfare scheme or paid privately. Children who studied at municipal schools had significantly higher probability of having school absences (OR=4.23, 95%CI =2.81 to 6.37, p < 0.001) than children from state schools. Children who studied at private schools had significantly lower probability of being absent from school for dental reasons (OR=0.02, 95%CI =0.006 to 0.04, p < 0.001).

Dental status affected school absence. When number of decayed teeth and number of filled teeth variables were adjusted for age and sex, children having decayed teeth were 2 times more likely to miss school compared to those who had no decayed teeth (OR=2.06, 95%CI =1.53 to 2.77, p < 0.001). However, sex and number of filled teeth were not the independent variables predicting dental school absenteeism; p-value=0.783 and 0.571 respectively. In comparison with the crude effects in the unadjusted regression (Table 7.2), the age-sex adjustment model (Table 7.3) hardly changed the point estimates and the significance of all explanatory variables. And there were trends of decreasing school absence when father's educational level, mother's educational level and family income were increased.

7.2.1.2 Effects of all explanatory variables on school absenteeism for dental reasons in the fully adjusted model (sex, age, social variables and dental health status)

As previously mentioned, there are several social variables considered as explanatory variables for school absences. Therefore, in the following adjusted logistic regression analysis the associations between the social variables predicting school absence due to dental reasons were tested. The results showed the sex and age adjusted associations of each explanatory variable after adjusting for social variables. In the first stage the effect of mother's educational level and family income were adjusted together (Table 7.4 stage 1). The effects of mother's educational level, family income and age variables were altered but maintained statistical significance suggesting that there are confounding effects between mother's educational level and family income. For example, the odds ratio of children aged 12-13 years old changed from OR=0.41 (95%CI =0.20 to 0.84, p=0.015) in the age-sex adjusted model to 0.34 (95%CI =0.16 to 0.72, p=0.005). The effect of maternal education was reduced slightly but remained strongly statistically significant, it changed from OR=0.05 (95%CI =0.03 to 0.12, $p < 0.001$) in the age-sex adjusted model to 0.13 (95%CI =0.06 to 0.27, $p < 0.001$). The effect of family income at the most affluent level decreased. The odds ratio changed from OR=0.05 (95%CI =0.03 to 0.10, $p < 0.001$) in the age-sex adjusted model to OR=0.14 (95%CI =0.07 to 0.25, $p < 0.001$) in the Stage 1 model.

In Stage 2, when school type was additionally adjusted for the effect of school type, it showed that children from municipal schools had a significantly higher risk of school absenteeism for dental reasons (OR=3.99, 95%CI =2.56 to 6.24, $p < 0.001$) in comparison to their counterparts attending state schools. Furthermore, private school children had a much lower likelihood of school absence for dental reasons, (OR=0.02, 95%CI =0.009 to 0.06, $p < 0.001$) when comparing to municipal school children. In addition, the strength of the effect of both mother's educational level and family income were decreased after the adjustment. These results indicated that the relation between the prevalence of school absence due to

dental reasons and mother's educational level and family income were confounded by school type. In addition, the effect of age was also confounded by school type. After adjustment for school type, the effect of age was attenuated and became statistically non-significant (p=0.572) confirming that age was not an independent variable. The odds ratio of age 12-13 years old changed from OR=0.34 (95%CI =0.16 to 0.72, p=0.005) in Stage 1 to OR=0.73 (95%CI =0.25 to 2.13, p=0.572).

When dental care scheme was adjusted in Stage 3, the point estimate of effect of the three major explanatory variables; mother's educational level, family income and school type altered. The effect of these variables decreased, indicating that dental care scheme was confounded with mother's educational level, family income and school type. Odds ratio of mother's educational level at a degree level, of the highest family income (above 15,000 baht), of private school children became 0.23 (95%CI =0.09 to 0.54, p=0.001), 0.39 (95%CI =0.18 to 0.83, p=0.015) and 0.02 (95%CI =0.01 to 0.06, $p < 0.001$), respectively. However, they remained statistically significant indicating that they are independent variables.

In Stage 4, adjusting for parent's marital status, where the effect of all previously adjusted variables were not altered, parent's marital status was not associated with the strength of other variables predicting dental related school absenteeism. Consequently, parent's marital status was not a strong predictor for school absence due to dental reasons. Its effect was attenuated and was no longer statistically significant after adjusting for all social variables (OR=1.28 95%CI =0.80 to 2.06, p=0.294).

In Stage 5, dental health status was added to complete the adjustment. After adjusting for age-sex, socioeconomic status, school type, dental care scheme, parent's marital status and dental health status altogether, the effect of most social variables were not altered much which suggests that the effect of social variables on school absenteeism due to dental reasons were not confounded by the number of decayed teeth. However, the explanatory variables that remained significant

after the adjustment were mother's educational level, family income, school type, dental care scheme and number of decayed teeth. Odds ratio of mother's educational level at a degree level changed from OR=0.05 (95% CI =0.03 to 0.12, $p < 0.001$) in age-sex adjusted model to OR=0.26 (95% CI =0.11 to 0.63, p=0.003). The effect of monthly income that remained significant was the highest level of income (above 15,000 baht) also altered from OR=0.05 (95% CI =0.03 to 0.10, $p < 0.001$) in the age-sex adjusted model to OR=0.40 (95% CI =0.18 to 0.86, p=0.019).

Children who were studying at municipal schools had remarkably more likelihood of school loss for dental reasons than private school children ($p < 0.001$) whereas children who were studying at private school had less likelihood of missing school for dental reasons ($p < 0.001$). The odds ratio in the full adjustment model of municipal school children was OR=3.91 (95% CI =2.49 to 6.12) and private school children had odds ratio of 0.03 (95% CI =0.01 to 0.06).

Children who were using Thai government health care scheme were nearly 2 times more likely to miss school (OR=1.92, 95% CI =1.20 to 3.07, p=0.006) than those who were using parents' health care scheme or paid privately, Although the effect of dental care scheme was attenuated from OR=7.04 (95% CI =5.01 to 9.88, $p < 0.001$) in the unadjusted model.

When dental health variables were considered, the effect of number of decayed teeth remained statistically significant (p=0.021) indicating that it was an independent variable predictive school absence for dental reasons. However its point estimate was decreased in fully adjusted model suggesting that the effect of number of decayed teeth was also confounded by other social variables. After adjusting for all aforementioned variables, children with decayed teeth were 1.58 (95%CI =1.07 to 2.34, p=0.021) times more likely to miss school than those without tooth decay (Table 7.4). On the other hand, results indicate that the number of filled teeth had no effect on other variables and on the outcome.

In conclusion, after adjustment for all the variables in this final model, results indicated that mother's educational level, family monthly income, school type, dental care scheme and having decayed teeth were independent variables and statistically significantly associated with prevalence of school absence due to dental reasons.

7.3 Summary

The findings support the hypotheses of the study; *Hypothesis 3* that the prevalence of dentally related school absence will be higher in lower socioeconomic group, poor dental health status children and associated with school type. The findings in this chapter answered the following objectives of the study:

Objective 3 - To assess the association between children's socioeconomic status and school absence due to dental reasons

- School absence due to dental reasons was significantly lower in children who had higher socioeconomic status. The association remained after adjusting for demographic variables, a number of social variables and dental health status.

Objective 4 - Investigate the association between dental health status and school absences due to dental reasons.

- School absence due to dental reasons was significantly higher in children who had poorer dental health status; having decayed teeth. The association remained after adjusting for demographic variables and a number of social variables.

Objective 5 - Investigate the association between school type and school absences due to dental reasons.

- School absence due to dental reasons was significantly higher in children who studied at municipal schools but lower in children who studied at private schools. The association remained after adjusting for demographic variables, a number of social variables and dental health status.

Table 7.1: The association between school absence for dental reasons and demographic, social and dental health variables: bivariate analysis

Variables	N** (%)		p-value
	No	Yes	
Sex			0.834
Male	470 (77.3)	138 (22.7)	
Female	428 (77.8)	122 (22.2)	
Age (years)			0.026
9-10	288 (77.0)	86 (23.0)	
11	530 (76.4)	164 (23.6)	
12-13	80 (88.9)	10 (11.1)	
Father's educational level			< 0.001*
primary school or less	149 (55.2)	121 (44.8)	
Junior –high school	219 (75.8)	70 (24.2)	
Vocational	218 (89.3)	26 (10.7)	
degree level	225 (94.5)	13 (5.5)	
Mother's educational level			< 0.001*
Primary school or less	219 (57.9)	159 (42.1)	
Junior – High school	216 (81.8)	48 (18.2)	
Vocational	180 (89.1)	22 (10.9)	
Degree level	222 (96.1)	9 (3.9)	
Family monthly income (baht)			< 0.001*
3,000 or less	87 (50.9)	84 (49.1)	
3,001- 9000	276 (69.0)	124 (31.0)	
9,001 – 15,000	149 (88.7)	19 (11.3)	
15,001 or more	326 (94.5)	19 (5.5)	
School type			< 0.001
State	283 (64.8)	154 (35.2)	
Municipal	44 (30.3)	101 (69.7)	
Private	571 (99.1)	5 (0.9)	
Dental care scheme			< 0.001
Parents' health welfare scheme or paid privately	565 (91.4)	53 (8.6)	
Thai government health care scheme	268 (60.2)	177 (39.8)	
Parent's marital status			0.011
Both parents	747 (79.9)	188 (20.1)	
Single parent	121 (66.5)	61 (33.5)	
Number of decayed teeth			< 0.001
Decayed teeth=0	422 (84.4)	78 (15.6)	
Decayed teeth > 0	476 (72.3)	182 (27.7)	
Number of filled teeth			0.537
Filled teeth=0	621 (77.0)	185 (78.7)	
Filled teeth > 0	277 (23.0)	75 (21.3)	
DMFT			0.025
≤1	583 (79.6)	149 (20.4)	
> 1	315 (73.9)	111 (26.1)	

* Test for linear trend

** Does not add up to 1,158 because some children/parents said 'I cannot remember'

Table 7.2: The association between school absence for dental reasons and explanatory variables: unadjusted bivariate analysis (OR 95%CI)

Variables	Unadjusted	p-value
Sex		
Male	1.00	
Female	0.97 (0.73, 1.28)	0.434
Age (years)		
9-10	1.00	
11	1.03 (0.76, 1.39)	0.815
12-13	0.41 (0.20, 0.84)	0.015
Father's educational level		
Primary school or less	1.00	
Junior – High school	0.39 (0.27, 0.56)	< 0.001
Vocational	0.14 (0.09, 0.23)	< 0.001
Degree level	0.07 (0.04, 0.13)	< 0.001
Mother's educational level		
primary school or less	1.00	
Junior –high school	0.30 (0.21, 0.44)	< 0.001
Vocational	0.16 (0.10, 0.27)	< 0.001
degree level	0.05 (0.02, 0.11)	< 0.001
Family monthly income		
3,000 or less	1.00	
3,001- 9000	0.46 (0.32, 0.67)	< 0.001
9,001 – 15,000	0.13 (0.07, 0.23)	< 0.001
15,001 or more	0.06 (0.03, 0.10)	< 0.001
School type		
State	1.00	
Municipal	4.21 (2.81, 6.32)	< 0.001
Private	0.02 (0.006, 0.04)	< 0.001
Dental care scheme		
Parents' health welfare scheme or paid privately	1.00	
Thai government health care scheme	7.04 (5.01, 9.88)	< 0.001
Parent's marital status		
Both parents	1.00	
Single parent	2.00 (1.41, 2.83)	0.016
Number of decayed teeth		
Decayed teeth=0	1.00	
Decayed teeth >0	2.06 (1.53, 2.78)	< 0.001
Number of filled teeth		
Filled teeth=0	1.00	
Filled teeth > 0	0.90 (0.67, 1.23)	0.537
DMFT		
≤ 1	1.00	
> 1	1.37 (1.04, 1.82)	0.025

Table 7.3: The association between school absence for dental reasons and explanatory variables: adjusted for age and sex (OR 95%CI)

Variables	Age-sex adjusted	p-value
Sex		
Male	1.00	
Female	0.96 (0.72, 1.26)	0.783
Age (years)		
9-10	1.00	
11	1.03 (0.76, 1.39)	0.816
12-13	0.41 (0.20, 0.84)	0.015
Father's educational level		
Primary school or less	1.00	
Junior – High school	0.38 (0.26, 0.55)	< 0.001
Vocational	0.14 (0.09, 0.23)	< 0.001
Degree level	0.06 (0.03, 0.12)	< 0.001
p-value for trend	-	*< 0.001*
Mother's educational level		
Primary school or less	1.00	
Junior – High school	0.30 (0.20, 0.44)	< 0.001
Vocational	0.16 (0.10, 0.27)	< 0.001
Degree level	0.05 (0.03, 0.12)	< 0.001
p-value for trend	-	*< 0.001*
Family monthly income (Baht)		
3,000 or less	1.00	
3,001- 9000	0.47 (0.32, 0.68)	0.001
9,001 – 15,000	0.13 (0.07, 0.23)	< 0.001
15,001 or more	0.05 (0.03, 0.10)	< 0.001
p-value for trend		< 0.001
School type		
State	1.00	
Municipal	4.23 (2.81, 6.37)	< 0.001
Private	0.02 (0.006, 0.04)	< 0.001
Dental care scheme		
Parents' health welfare scheme or paid privately	1.00	
Thai government health care scheme	7.07 (5.03, 9.95)	< 0.001
Parent's marital status		
Both parents	1.00	
Single parent	1.96 (1.38, 2.78)	< 0.001
Number of decayed teeth		
Decayed teeth=0	1.00	
Decayed teeth > 0	2.06 (1.53, 2.77)	< 0.001
Number of filled teeth		
Filled teeth=0	1.00	
Filled teeth > 0	0.91 (0.67, 1.24)	0.571
DMFT		
≤1	1.00	
> 1	1.68 (1.26, 2.26)	< 0.001

Table 7.4: The association between school absence for dental reasons and explanatory variables: fully adjusted for sex, age, social variables and dental health status (OR, 95%CI)

Variables	Stage 1	p-value	Stage 2	p-value	Stage 3	p-value	Stage 4	p-value
Sex								
Male	1.00		1.00		1.00		1.00	
Female	0.94 (0.69, 1.29)	0.727	0.93 (0.64, 1.35)	0.731	0.89 (0.61, 1.30)	0.570	0.90 (0.62, 1.30)	0.585
Age (years)								
9-10	1.00		1.00		1.00		1.00	
11	0.95 (0.68, 1.33)	0.792	1.00 (0.68, 1.35)	0.961	1.04 (0.70, 1.55)	0.819	1.03 (0.69, 1.52)	0.882
12-13	0.34 (0.16, 0.72)	0.005	0.73 (0.25, 2.13)	0.572	0.73 (0.25, 2.08)	0.563	0.72 (0.25, 2.06)	0.546
Mother's educational level								
Primary school or less	1.00		1.00		1.00		1.00	
Junior – High school	0.38 (0.26, 0.57)	< 0.001	0.40 (0.24, 0.64)	< 0.001	0.41 (0.25, 0.67)	< 0.001	0.40 (0.24, 0.65)	< 0.001
Vocational	0.31 (0.18, 0.52)	< 0.001	0.38 (0.20, 0.69)	0.002	0.42 (0.22, 0.78)	0.007	0.40 (0.21, 0.75)	0.005
Degree level	0.13 (0.06, 0.27)	< 0.001	0.18 (0.07, 0.41)	< 0.001	0.23 (0.09, 0.54)	0.001	0.22 (0.09, 0.52)	0.001
Family monthly income								
3,000 or less	1.00		1.00		1.00		1.00	
3,001 – 9000	0.57 (0.38, 0.83)	0.004	0.70 (0.44, 1.15)	0.135	0.75 (0.47, 1.19)	0.229	0.77 (0.49, 1.23)	0.289
9,001 – 15,000	0.21 (0.11, 0.38)	< 0.001	0.48 (0.20, 0.69)	0.043	0.57 (0.27, 1.18)	0.133	0.59 (0.28, 1.24)	0.170
15,001 or more	0.14 (0.07, 0.25)	< 0.001	0.28 (0.14, 0.58)	0.001	0.39 (0.18, 0.83)	0.015	0.40 (0.19, 0.87)	0.020
School type								
State			1.00		1.00		1.00	
Municipal			3.99 (2.56, 6.24)	< 0.001	3.99 (2.55, 6.24)	< 0.001	3.96 (2.52, 6.20)	< 0.001
Private			0.02 (0.009, 0.06)	< 0.001	0.02 (0.01, 0.06)	< 0.001	0.03 (0.01, 0.06)	< 0.001
Dental care scheme								
Parents' health welfare scheme or paid privately					1.00		1.00	
Thai government health care scheme					1.93 (0.90, 3.52)	0.005	1.89 (1.19, 3.02)	0.007
Parent's marital status								
Both parents							1.00	
Single parent							1.28 (0.80, 2.06)	0.294

Table 7.4: The association between school absence for dental reasons and explanatory variables: fully adjusted for sex, age, social variables and dental health status (OR, 95%CI) (continued)

Variables	Stage 5 (Fully adjusted)	p-value
Sex		
Male	1.00	
Female	0.90 (0.62, 1.31)	0.590
Age (years)		
9 - 10	1.00	
11	1.06 (0.71, 1.58)	0.766
12 - 13	0.72 (0.25, 2.09)	0.555
Mother's educational level		
Primary school or less	1.00	
Junior – High school	0.41 (0.26, 0.68)	0.001
Vocational	0.41 (0.22, 0.79)	0.007
Degree level	0.26 (0.11, 0.63)	0.003
p-value for trend	-	*< 0.001*
Family monthly income		
3,000 or less	1.00	
3,001 - 9000	0.79 (0.50, 1.27)	0.346
9,001 - 15,000	0.60 (0.29, 1.27)	0.186
15,001 or more	0.40 (0.18, 0.86)	0.019
p-value for trend	-	*0.047*
School type		
State	1.00	
Municipal	3.91 (2.49, 6.12)	< 0.001
Private	0.03 (0.01, 0.06)	< 0.001
Dental care scheme		
Parents' health welfare scheme or paid privately	1.00	
Thai government health care scheme	1.92 (1.20, 3.07)	0.006
Parent's marital status		
Both parents	1.00	
Single	1.28 (0.79, 2.06)	0.304
Number of decayed teeth		
Decayed teeth=0	1.00	
Decayed teeth >0	1.58 (1.07, 2.34)	0.021
Number of filled teeth		
Filled teeth=0	1.00	
Filled teeth > 0	0.99 (0.66, 1.50)	0.995

CHAPTER 8

PREVALENCE OF DENTAL IMPACTS ON DAILY PERFORMANCES ASSOCIATED WITH DENTAL PAIN AND DISCOMFORT AND FACTORS ASSOCIATED WITH THE IMPACTS

8 PREVALENCE OF DENTAL IMPACTS ON DAILY PERFORMANCES AND FACTORS RELATED TO THE PREVALENCE OF DENTAL IMPACTS ON DAILY PERFORMANCES IN THAI SCHOOLCHILDREN

Dental impacts on daily performances will be explored and presented in this chapter. First, the results of the impacts caused by dental pain/dental discomfort are shown. The general frequency distributions of dental impacts associated with explanatory variables are presented. Then the association between dental impacts on daily performances and explanatory variables are explored using bivariate analysis and logistic regression analysis follows.

8.1 Prevalence of dental impacts on daily performances

As impacts of dental pain or dental discomfort may affect children's school attendance and performance in class, their impacts on children's daily performances were assessed using a self administered questionnaire.

Of the 1,158 children only 89 (7.7%) had never experienced dental pain or dental discomfort in their life. Those who had experienced dental pain or dental discomfort may also have experienced impacts on their daily lives. As many of the children had experienced dental pain or dental discomfort some time before the survey they were asked about the impacts of their last most recent dental pain/discomfort on certain daily performances. The performances included eating, speaking, cleaning teeth and mouth, sleeping, maintaining good emotional state, smiling, studying and lastly, socializing with other people.

Dental pain or dental discomfort impacted on many children's lives. Overall, 964 (83.2%) children had at least one impact from dental pain or dental discomfort on

their daily performances whereas only 194 (16.8%) did not have any impact from dental pain or dental discomfort. Eating was the most commonly affected performance (67.2%). The striking finding on impacts on daily performances was the relatively high percentages with moderate/severe levels of impacts. For example, 24.4% of children had moderate/severe impacts on eating, 20.3% on cleaning teeth and 13.2% had their emotional state affected to a moderate/severe degree by their dental pain or dental discomfort. It is particularly interesting to note that almost one in five children (19.3%) with dental pain/discomfort had their studies affected (Table 8.1).

Table 8.1: Prevalence and severity of impacts in daily performance related to latest dental pain/discomfort in 1,158 children in Maung district, Lampang

Daily performance	Severity of impacts (N (%))			
	No	Mild	Moderate	Severe
Eating food	380 (32.8)	494 (42.7)	274 (23.7)	10 (0.8)
Speaking	857 (74.0)	208 (18.0)	87 (7.5)	6 (0.5)
Cleaning	596 (51.5)	327 (28.2)	203 (17.5)	32 (2.8)
Sleeping	908 (78.4)	147 (12.7)	87 (7.5)	16 (1.4)
Maintain emotion	759 (65.5)	247 (21.3)	133 (11.5)	19 (1.7)
Smiling	881 (76.1)	178 (15.4)	90 (7.8)	9 (0.7)
Studying	934 (80.7)	145 (12.5)	71 (6.1)	8 (0.7)
Social contact	912 (78.8)	153 (13.2)	82 (7.1)	11 (0.9)
Children who had no impact	194 (16.8%)			
Children with at least one impact	964 (83.2%)			

8.2 Factors associated with the prevalence of dental impacts on daily performances

The dental impact on daily performances was analyzed in a similar manner to the analyses for school absence for dental reasons. The degrees of impact severity

were grouped into binary outcomes; no impact and presence of impact (the 3 levels of impact; mild, moderated and severe were grouped).
Firstly the association between dental impact on daily performances and explanatory variables was explored using the Chi-square test. Next, results of unadjusted logistic regression are shown. Then in order to explore in more detail the factors affecting the prevalence of having a dental impact, multivariate analyses were carried out. The explanatory variables used in the multiple logistic regression model and model building sequences are similar to what had been applied for the previous analyses on the school absences due to dental reasons.

8.2.1 The association between explanatory variables and dental impacts on daily performances: bivariate analysis

Analysis of the possible predictive variables showed that for demographic variables, neither sex nor age was statistically related to impacts. Among social variables, only father's educational level was highly statistically related to impacts; a higher proportion of children whose fathers had primary level education had dental impacts on their daily lives than those whose fathers were educated at degree level; 88.5% compared to 78.6% (p=0.016). But mother's education was not statically significantly associated with dental impacts (p=0.116) (Table 8.2). Children who were studying at municipal school had higher prevalence of dental impacts than their counterparts studying at state schools and private school; 86.2, 85.8 and 80.6% respectively (p=0.051).

Number of decayed teeth was the only dental health status variable related to the prevalence of dental impacts on daily performances ($p < 0.001$). About 88% of children (n=579) who had decayed teeth reported impacts from dental pain and discomfort compared to 77% of children who had no decayed teeth. The number of filled teeth was not related to the prevalence of oral impacts (p=0.497).

Bivariate logistic regression was then used to explore the relationships between outcomes and each category of the explanatory variables and also as a first step before model building for the adjusted logistic regression in the next step. The results confirmed that father's education was significantly associated with dental impact on daily performances. Furthermore, results also showed that mother's education at degree level and school type variables were highly statistically significantly associated with dental impacts. Despite the Chi-square test not showing statistically significance of the overall trend in prevalence of dental impacts for mother's education and school type, results from regression analysis showed that the likelihood of having a dental impact on daily performances among children who had degree level educated mothers were significantly less than of those children whose mother had primary level education. Children whose fathers or mothers was educated to degree level were respectively about 53% and 44% less likely to have a dental impact compared to those with primary level educated fathers or mothers (OR=0.47, 95%CI =0.29 to 0.77, p=0.003 and OR=0.56, 95%CI =0.36 to 0.86, p=0.008). Children who studied at private schools were significantly less likely to have dental impacts on daily performances compared to those in state schools (OR=0.68, 95%CI =0.49 to 0.96, p=0.029), whereas, municipal school children had a similar likelihood of having impacts to state school children. Children who had decayed teeth were 32% more likely to have dental impacts on their daily performances than those without decayed teeth (OR=1.32, 95%CI =1.04 to 1.66, $p < 0.001$) (Table 8.3).

8.3 The relationship between explanatory variables and dental impacts on daily performances: multiple logistic regression analysis

8.3.1 Associations of dental impacts on daily performances with explanatory variables: multiple logistic regression analysis

In the unadjusted analysis, only parent's education, school type and number of decayed teeth were significantly associated with the prevalence of dental impacts on daily performances. However the strength of each variable on predicting dental impacts on daily performances was not clear because of the collinearity caused by the fact that those variables might be associated with each other (Spearman's correlation, p-value < 0.001). Also, it is important to assess the effect of social variables and dental health status on dental impacts on their daily performances after adjusting for each other. Hence, the next step was to carry out a multiple regression analysis adjusting for demographic variables, social variables and dental health status.

8.3.2 Effects of all explanatory variables on dental impacts on daily performances, using multiple logistic regression and adjusting for age and sex

The explanatory variables were adjusted for age and sex (Table 8.4). In comparison with the crude effects in the unadjusted regression (Table 8.3), the age-sex adjustment hardly changed the point estimates and the significance of all explanatory variables. The results showed the effect of two socioeconomic status variables, namely that the effects of father's educational level and mother's educational level, on dental impacts on daily performances were quite strong when adjusted for age and sex. Similar results were also found for the effect of school type and number of decayed teeth. Children whose fathers or mothers were educated to degree level were substantially less likely to have a dental impact, compared to those with primary level educated fathers or mothers (OR=0.48, 95%CI =0.29 to 0.78, p=0.003 and OR=0.56, 95% CI =0.36 to 0.86, p=0.009). Children who studied at private schools were significantly less likely to have dental impacts on daily performances compared to those in state schools and municipal schools (OR=0.67 95%CI =0.48 to 0.95, p=0.025). Children having decayed teeth were about 2 times more likely to have dental impacts compared to those who had no decayed teeth. The number of decayed teeth were independent

indicators in the model (OR=2.24, 95%CI =1.63 to 3.07). However, sex, age, family income, dental care scheme, parent's marital status and number of filled teeth were not independent variables predicting dental impacts on daily performances as they remained statistically non-significant (Table 8.4).

8.3.3 Effects of all explanatory variables on dental impacts on daily performances: fully adjusted model (sex, age, social variables and dental health status)

In the following adjusted logistic regression analysis, we tested whether there were any associations between the social variables predicting dental impacts on daily performances. Even though the results in the unadjusted logistic regression analysis did not show that some of them were significantly related to dental impacts on daily performances, it is interesting to assess whether these explanatory variables may be associated with the effects of other explanatory variables on predicting dental impact on daily performances and to be consistent with the analysis for school absenteeism for dental reasons.

Table 8.5 shows the point estimate of the effect of each variables adjusting for social variables and also adjusted for age and sex. In the first stage, mother's educational level, family income, were adjusted for each other. The effect of mother's educational level decreased, with odds ratio changed from OR=0.56, 95%CI =0.36 to 0.86, p=0.009 in the age-sex adjusted model to OR=0.66, 95%CI =0.40 to 1.08, p=0.105 suggesting mother's educational level was not an independent variable predicting dental impacts on daily performances since it became statistically non-significant (Table 8.5 Stage 1).

In the following stage, Stage 2, in which school type was additionally adjusted for, the effect of private school attenuated and became non-significant from the odds ratio of 0.67, 95% CI =0.48 to 0.95, p=0.025 in an age-sex adjusted model to OR=0.73, 95%CI =0.51 to 1.06, p=0.098, suggesting that school type was

confounded by mother's educational level variable. This finding also indicates that school type was not a strong predictor of the prevalence of having dental impacts on daily performances. This suggested that there was no statistically significant difference of the likelihood in having dental impacts on daily performances among children who were studying in different types of school.

In Stage 3 when the dental care scheme was also included for in the model, the effect of mother's educational level, family income, sex and age were not altered. This suggested that dental care scheme had no association with other variables on having dental impacts on daily performances.

In Stage 4, when parent's marital status was additionally adjusted for in the model, again there was no alteration or only minor alteration in all variables indicating that parent's marital status had no association with other variables on having dental impacts on daily performances.

In Stage 5, both the number of decayed teeth and number of filled teeth variables were additionally adjusted to demographic and social variables to construct a full model and to explore the confounding effect of each variable. After adjustment for all explanatory variables, the model indicates that number of decayed teeth was the only independent variable and was also highly statistically significant in predicting the prevalence of dental impacts on daily performances. Children who had decayed teeth were about 2 times more likely to have a dental impact on daily performances than those who did not have decayed teeth with highly statistically significant level; OR=2.10, 95%CI =1.52, 2.92, $p < 0.001$. On the other hand, results showed that the number of filled teeth had no effect on other variables and it also had no effect on predicting dental impacts on daily performances (Table 8.5).

8.4 Summary

In summary, the findings partially support the hypotheses of the study, *Hypothesis 4,* that the prevalence of dental impacts from dental pain and dental discomfort on daily performances of children will be higher in lower socioeconomic groups, poor dental health status children and associated with school type.

The findings in this chapter relate to the following objectives of the study:

Objective 6 - Assess the prevalence of impact of dental pain or dental discomfort on daily performances in Grade 5 primary schoolchildren

- Overall, 83.2% children had at least one impact from dental pain and dental discomfort on their daily performances.

Objective 7 - To assess the association between children' socioeconomic status and the impact of dental pain or dental discomfort on daily activities

- Prevalence of dental impacts on daily performances was significantly lower in higher socioeconomic status children. But the association did not remain after adjusting for demographic variables, a number of social variables and dental health status.

Objective 8 - To assess the association between dental health status and the impact of dental pain or dental discomfort on daily performances

- The prevalence of dental impacts on daily performances was significantly higher in children who had poorer dental decay status. The association remained after adjusting for demographic variables and a number of social variables.

Objective 9 - Investigate the association between school type and the impact of dental pain or dental discomfort on daily performances

- Prevalence of dental impacts on daily performances was significantly lower in children in private schools but was not significant after adjusting demographic variables, a number of social variables and dental health status.

Table 8.2: The association between dental impacts on daily performances and demographic, social and dental health variables: bivariate analysis

Variables	N** (%)		Overall p-value
	No	Yes	
Sex			0.736
Male	104 (17.1)	504 (82.9)	
Female	90 (16.4)	460 (83.6)	
Age (years)			0.278
9 - 10	72 (19.3)	302 (80.7)	
11	107 (15.4)	587 (84.6)	
12 - 13	15 (16.7)	75 (83.3)	
Father's educational level			0.016*
primary school or less	31 (11.5)	239 (88.5)	
Junior - high school	42 (14.5)	247 (85.5)	
Vocational	49 (20.1)	195 (79.9)	
degree level	51 (21.4)	187 (78.6)	
Mother's educational level			0.116*
Primary school or less	52 (13.8)	326 (86.2)	
Junior - High school	46 (17.4)	218 (82.6)	
Vocational	32 (15.8)	170 (84.2)	
Degree level	51 (22.1)	180 (77.9)	
Family monthly income			0.157*
3,000 or less	25 (14.6)	146 (85.4)	
3,001 - 9000	55 (13.8)	345 (86.3)	
9,001 - 15,000	30 (17.9)	138 (82.1)	
15,001 or more	70 (36.1)	275 (28.5)	
School type			0.051
State	62 (14.2)	375 (85.8)	
Municipal	20 (13.8)	125 (86.2)	
Private	112 (19.4)	464 (80.6)	
Dental care scheme			0.141
Parents' health welfare scheme or paid privately	116 (18.8)	502 (82.1)	
Thai government health care scheme	65 (14.6)	380 (85.4)	
Parent's marital status			0.355
Both parents	160 (17.1)	775 (82.9)	
Single parent	25 (13.7)	157 (86.3)	
Number of decayed teeth			<0.001
Decayed teeth =0	115 (23.0)	385 (77.0)	
Decayed teeth > 0	79 (12.0)	579 (88.0)	
Number of filled teeth			0.497
Filled teeth =0	139 (17.2)	667 (82.8)	
Filled teeth > 0	55 (15.6)	297 (84.4)	
DMFT			0.091
≤ 1	133 (18.2)	599 (81.8)	
> 1	61 (14.32)	365 (85.7)	

* Test for linear trend

** Does not add up to 1,158 because some children/parents said 'I cannot remember'

Table 8.3: The association between dental impacts on daily performances and explanatory variables: unadjusted bivariate analysis (OR 95%CI)

Variables	Unadjusted	p-value
Sex		
Male	1.00	
Female	1.05 (0.77, 1.43)	0.736
Age (years)		
9 - 10	1.00	
11	1.30 (0.94, 1.81)	0.110
12 - 13	1.19 (0.64, 2.19)	0.573
Father's educational level		
primary school or less	1.00	
Junior - high school	0.76 (0.46, 1.25)	0.286
Vocational	0.51 (0.31, 0.84)	0.008
degree level	0.47 (0.29, 0.77)	0.003
Mother's educational level		
Primary school or less	1.00	
Junior - High school	0.75 (0.49, 1.16)	0.204
Vocational	0.84 (0.52, 1.36)	0.497
Degree level	0.56 (0.36, 0.86)	0.008
Family monthly income		
3,000 or less	1.00	
3,001 - 9000	1.07 (0.64, 1.79)	0.784
9,001 - 15,000	0.78 (0.44, 1.41)	0.420
15,001 or more	0.67 (0.41, 1.11)	0.119
School type		
State	1.00	
Municipal	1.03 (0.60, 1.78)	0.906
Private	0.68 (0.49, 0.96)	0.029
Dental care scheme		
Parents' health welfare scheme or paid privately	1.00	
Thai government health care scheme	1.35 (0.96, 1.88)	0.075
Parent's marital status		
Both parents	1.00	
Single parent	1.29 (0.82, 2.04)	0.263
Number of decayed teeth		
Decayed teeth =0	1.00	
Decayed teeth > 0	1.32 (1.04, 1.66)	<0.001
Number of filled teeth		
Filled teeth =0	1.00	
Filled teeth > 0	1.12 (0.80, 1.58)	0.497
DMFT		
≤ 1	1.00	
> 1	1.33 (0.95, 1.85)	0.091

Table 8.4: The association between dental impacts on daily performances and explanatory variables: adjusted for age and sex (OR, 95%CI)

Variables	Age-sex adjusted	p-value
Sex		
Male	1.00	
Female	1.05 (0.77, 1.43)	0.730
Age (years)		
9 - 10	1.00	
11	1.30 (0.94, 1.81)	0.110
12 - 13	1.19 (0.64, 2.20)	0.568
Father's educational level		
primary school or less	1.00	
Junior - high school	0.77 (0.47, 1.27)	0.317
Vocational	0.52 (0.31, 0.84)	0.009
degree level	0.48 (0.29, 0.78)	0.003
P-value for trend	-	*0.001*
Mother's educational level		
Primary school or less	1.00	
Junior - High school	0.75 (0.49, 1.16)	0.210
Vocational	0.84 (0.52, 1.37)	0.504
Degree level	0.56 (0.36, 0.86)	0.009
P-value for trend	-	*0.018*
Family monthly income		
3,000 or less	1.00	
3,001 - 9000	1.08 (0.65, 1.81)	0.747
9,001 - 15,000	0.79 (0.44, 1.42)	0.439
15,001 or more	0.68 (0.41, 1.12)	0.134
P-value for trend	-	*0.023*
School type		
State	1.00	
Municipal	1.01 (0.59, 1.75)	0.944
Private	0.67 (0.48, 0.95)	0.025
Dental care scheme		
Parents' health welfare scheme or paid privately	1.00	
Thai government health care scheme	1.35 (0.97, 1.88)	0.074
Parent's marital status		
Both parents	1.00	
Single parent	1.27 (0.80, 2.00)	0.303
Number of decayed teeth		
Decayed teeth =0	1.00	
Decayed teeth > 0	2.24 (1.63, 3.07)	<0.001
Number of filled teeth		
Filled teeth =0	1.00	
Filled teeth > 0	1.11 (0.79, 1.56)	0.538
DMFT		
≤1	1.00	
> 1	1.32 (0.95, 1.84)	0.091

Table 8.5: The association between dental impacts on daily performances and explanatory variables: fully adjusted for sex, age, socioeconomic status, school type, social related variables and dental health status (OR, 95%CI)

Variables	Stage 1	p-value	Stage 2	p-value	Stage 3	p-value	Stage 4	p-value
Sex								
Male	1.00		1.00				1.00	
Female	1.05 (0.77, 1.44)	0.718	1.06 (0.77, 1.44)	0.727	1.06 (0.77, 1.45)	0.702	1.06 (0.78, 1.45)	0.699
Age (years)								
9 - 10	1.00		1.00				1.00	
11	1.29 (0.93, 1.80)	0.123	1.30 (0.93, 1.81)	0.120	1.29 (0.93, 1.80)	0.125	1.28 (0.92, 1.79)	0.142
12 - 13	1.13 (0.60, 2.09)	0.703	1.24 (0.66, 2.33)	0.492	1.25 (0.67, 2.34)	0.487	1.26 (0.67, 2.36)	0.471
Mother's educational level								
Primary school or less	1.00		1.00		1.00		1.00	
Junior - High school	0.79 (0.50, 1.23)	0.300	0.83 (0.53, 1.30)	0.424	0.83 (0.52, 1.29)	0.411	0.81 (0.52, 1.28)	0.379
Vocational	0.94 (0.56, 1.59)	0.846	0.99 (0.59, 1.68)	0.998	0.99 (0.59, 1.68)	0.992	0.98 (0.58, 1.66)	0.935
Degree level	0.66 (0.40, 1.08)	0.105	0.69 (0.42, 1.14)	0.151	0.69 (0.41, 1.16)	0.165	0.68 (0.40, 1.13)	0.137
Family monthly income								
3,000 or less	1.00		1.00		1.00		1.00	
3,001 - 9000	1.13 (0.67, 1.91)	0.621	1.19 (0.71, 2.02)	0.496	1.21 (0.71, 2.04)	0.474	1.24 (0.73, 2.10)	0.428
9,001 - 15,000	0.87 (0.47, 1.61)	0.672	0.98 (0.52, 1.81)	0.939	0.99 (0.52, 1.88)	0.993	1.03 (0.54, 1.95)	0.929
15,001 or more	0.81 (0.46, 1.43)	0.480	0.91 (0.51, 1.62)	0.755	0.93 (0.50, 1.71)	0.812	0.96 (0.51, 1.78)	0.890
School type								
State			1.00		1.00		1.00	
Municipal			0.95 (0.55, 1.66)	0.873	0.95 (0.54, 1.65)	0.847	0.94 (0.54, 1.65)	0.842
Private			0.73 (0.51, 1.06)	0.098	0.74 (0.51, 1.07)	0.114	0.74 (0.51, 1.07)	0.110
Dental care scheme								
Parents' health welfare scheme or paid privately					1.00		1.00	
Thai government health care scheme					1.01 (0.67, 1.55)	0.927	0.99 (0.65, 1.52)	0.998
Parent's marital status								
Both parents							1.00	
Single parent							1.17 (0.72, 1.88)	0.528

Table 8.5: The association between dental impacts on daily performances and explanatory variables: fully adjusted for sex, age, socioeconomic status, school type, social related variables and dental health status (OR, 95%CI) (continued)

Variables	Stage 5 (Fully adjusted)	p-value
Sex		
Male	1.00	
Female	1.11 (0.81, 1.53)	0.516
Age (years)		
9 - 10	1.00	
11	1.34 (0.95, 1.87)	0.092
12 - 13	1.35 (0.71, 2.54)	0.359
Mother's educational level		
Primary school or less	1.00	
Junior - High school	0.90 (0.57, 1.42)	0.653
Vocational	1.10 (0.64, 1.88)	0.724
Degree level	0.81 (0.47, 1.37)	0.432
P-value for trend	-	*0.301*
Family monthly income		
3,000 or less	1.00	
3,001 - 9000	1.26 (0.74, 2.14)	0.400
9,001 - 15,000	1.04 (0.54, 1.99)	0.896
15,001 or more	0.98 (0.53, 1.83)	0.957
P- value for trend	-	*0.649*
School type		
State	1.00	
Municipal	0.90 (0.94, 1.99)	0.727
Private	0.73 (0.71, 2.18)	0.098
Dental care scheme		
Parents' health welfare scheme or paid privately	1.00	
Thai government health care scheme	0.98 (0.64, 1.50)	0.938
Parent's marital status		
Both parents	1.00	
Single parent	1.14 (0.71, 1.85)	0.581
Number of decayed teeth		
Decayed teeth =0	1.00	
Decayed teeth > 0	2.10 (1.52, 2.92)	<0.001
Number of filled teeth		
Filled teeth =0	1.00	
Filled teeth > 0	1.14 (0.80, 1.62)	0.457

CHAPTER 9

DISCUSSION

9 DISCUSSION

This discussion focuses first on the main results of the study related to the hypotheses and objectives. The key findings are compared to other relevant research. Then the methodological considerations of this study and the strengths and weakness are discussed. Finally, conclusions and recommendations for future research and implication for public policies are presented.

9.1 School absence for dental reasons

This study set out to ascertain whether absence from school for dental reasons was considerable. The study was done in the belief that absence from school is a crude indicator but also can be considered a "stand alone" of the impacts of oral health on the quality of children's lives. It is very much linked with policy implication for planners of public dental services and school attendance management because absence from school for dental reasons may affect learning. And if absence from school was higher in lower socioeconomic groups then it could be a further cause of social inequalities.

The findings showed that cumulatively the number of hours missed for dental reasons per 1,000 children per year was considerable; the missed school hours per 1,000 children was 434 hours or 613 hours including dental screening. Among those who actually missed school for dental reasons, the volume of absenteeism was 1,923 hours per 1,000 children. However, when considered at the individual level, the average school time missed was quite low; 26 minutes per child or 37 minutes including screening per child per year. These figures for school hours missed are much lower than those reported in studies from the US. There, the estimates among children 8-12 years old were much higher (1,120 hours per 1,000 children or 81, 300 hours per 1,000 children among who actually missed school)

(Gift et al 1992). Those figures do not include time for routine dental care that was included in the Lampang study.

Variations in disease severity and patterns, particularly the levels of dental caries, may account for some of the differences observed between these studies. In the Lampang study the mean DMFT was quite low, 1.4, while the mean DMFT of the American children aged 12-15 years in the early 1990s was higher (2.06) (Beltran-Aguilar et al 2005). In addition, the decayed (D) teeth component of Lampang study sample was small; 0.8 for D. At such low levels of DMFT, the predominant form of caries is pit and fissure caries (Batchelor and Sheiham 2004). Furthermore, Lampang is a naturally fluoridated water area, 30% of 12 year old children had dental fluorosis (Dental Public Health Department 2000a).

One important methodological difference between the Lampang and Gift's study is that in her study, the school hours lost for the whole year were extrapolated from data for only 2 weeks. Children were asked how much school they had missed in the past 2 weeks. This could perhaps give inaccurate information since school absence for dental reasons is not constant over the year. So using incidence data may not be appropriate. On the other hand, in the Lampang study, absence was recorded for the whole school year. Furthermore, school time lost in Gift's study also included not only time loss for own dental problems or dental visits but also time loss to assist a relative or friend with dental problems or dental visits. The effect that this difference in the methodology may have on the actual results cannot be assessed. However, they limit direct comparability between the two studies.

Despite the lower school time lost in the Lampang sample than in the US study, the frequency of school absences for all dental reasons including attending SDS treatment was higher (22.5 %) than reported in Gift's study. Gift et al (1992) reported that only 1.3 % of children missed school for dental visits/problems (Gift et al 1992). A possible explanation for the differences in findings is the organised SDS in Lampang which may encourage and enable children to attend dental

treatment visits during school hours whereas such school dental service schemes are not common in the US.

When those attending for dental visits for SDS treatment in the Lampang study are excluded and only dental pain and private dental appointments included, the prevalence was 3.3% of children missing school. Indeed the prevalence of school absence for dental pain in this study was 0.5%; a prevalence similar to that found by Chen and Hunter (1996) over one year. They reported 1% of 12-13 year old children in New Zealand missed school because of dental pain (Chen and Hunter 1996). The prevalence figure reported here, based on a one year study, was much lower than that reported in the Thai National Oral Health survey in 2002. They reported that 14.3% of 12 year old Thai children missed school because of dental problems (Headquarters of Dental Public Health 2002). However, the mean DMFT of 12 year old Thai children in general was slightly higher; 1.6, and children in the Southern Thailand had an even higher mean DMFT of 2.1. Studies in other countries report a much higher prevalence (11.1%-70%) for missing school because of dental pain than in the present study. All of them collected data for shorter time frames; between 1-2 months (Shepherd et al 1999; Naidoo et al 2001; Stewart et al 2002; Ratnayake and Ekanayake 2005).

As stated earlier, overall, Grade 5 schoolchildren in the Lampang sample missed school for dental reasons for a mean of 434 hours or 73 days per 1,000 children per year. This is a relatively small amount per child. However, if all 8,922 Grade 5 children and all 48,448 primary school children in Lampang were considered, the amount of school absence is considerable. At a national level, this school time missed may be a significant problem in terms of school attendance.

9.1.1 Association between dental health status and school absence for dental reasons

This study found that school absence for dental reasons was associated with dental health status. The association between school absence and having decayed teeth was significant after adjustment for confounders. Children who had poor dental health status were more likely to miss school than children who had better dental health status. Children with low DMFT (<1) missed significantly less school than children who had higher DMFT score (Table 7.2). The number of decayed teeth was a strong and independent predictor for school absence for dental reasons (Table 7.4). The explanation for this is that decayed teeth either lead to dental treatment or dental pain, both of which often caused school absence.

There are no other published studies investigating the relationship between dental health status and school absence for dental reasons. However, many studies reported that poor dental status was positively related to the prevalence of dental pain (Slade 2001; Milsom et al 2002; Ratnayake and Ekanayake 2005; Vargas et al 2005). And many children missed school because of dental pain or dental problems (Adams and Benson 1990; Gift et al 1992; Chen and Hunter 1996; Shepherd et al 1999; Adams et al 1999; Naidoo et al 2001; Headquarters of Dental Public Health 2002; Stewart et al 2002; Skaret et al 2004; Ratnayake and Ekanayake 2005).

Association between socioeconomic status, social and demographic factors and school absence for dental reasons

Lower socioeconomic status children missed more school hours because for dental reasons than higher socioeconomic status children. The association between school absence and mother's educational level, family income, school type and dental care scheme were significant after adjustment for confounders. Parent's education and family income were significantly negatively related to

school absence for dental reasons which confirmed the finding by Gift et al (Gift et al 1992). Furthermore, other social variables were also related to school absence. Children studying in private schools missed considerably less school than those in state and municipal schools. The latter were also less affluent. This effect of school type on school absence is supported and can be explained by the fact that Thai parents of affluent family often enroll their children in private schools (Thammasiri 2001). Living with a single parent as well as using a dental care scheme that provided free public dental service only during government office hours (school hours) also increased the prevalence of school absence for dental reasons. However, the associations between parent's marital status and prevalence of school absences for dental reasons became non-significant after adjusting for all explanatory variables because being a single parent was associated with the low family earnings (Lipman et al 1997; Spencer 2005; Lipman and Boyle 2005; Bauman et al 2006).

Age of child did not linearly influence the prevalence of school absence but there was a significant difference between the youngest and the oldest age groups. Children aged 9-10 years were more likely to miss school than 12-13 year old children (Tables 7.1). However, age became non-significant after adjustment of other explanatory factors reflecting that age was not a strong predictor. Gift et al (1992) reported that school hours missed for dental visits or dental problems increased with age (Gift et al 1992). A possible explanation for this difference is that the age range of her group was much larger; 5-17 years old compared to 9-13 years in this study. A much more likely reason for the differences in findings is the exposure to an organised SDS in Thailand whereas such school dental service schemes are not common in the US. In Lampang this study population had been exposed to dental care by the SDS since they began their primary education in Grade 1. Therefore most teeth of older children had already been treated when the study was conducted when they were in Grade 5. This assumption is also supported by the higher average number of filled teeth and missing teeth as well as higher percentage of caries free children found among the 12-13 year old children in the Lampang group (Table 6.5). That assumption can be further

investigated by replicating the study in another area with similar social conditions but with a different oral health care system. Evidence of the effect of the children's sex on the prevalence of school absence for dental reasons has seldom been explored. In this study, prevalence of school absence did not differ between girls and boys.

Influence of the School Dental Service (SDS) on school absence

Even though the SDS was not treated as an explanatory variable in the present study it provides contextual explanations. Several studies reported that school dental screening increased dental care (Zarod and Lennon 1992; Hebbal and Nagarajappa 2005). But school screening in the Lampang study has been in operation since 1988 (Headquarters of Dental Public Health 1997). So school dental screening should be considered as a normal contextual factor because all students receive dental screening. Dental treatment had a direct effect on school time loss. The main reason for time loss was because of visits to the SDS. But, the cause of school absence is dental status of children. If children had no need for SDS treatment they would not have to miss school. And dental status was related to socioeconomic status.

Parents of disadvantaged Thai children rely more on the SDS (Lapying 1999; Wanabhirak 2006) for their children's dental care since it is free of charge and was accessible to disadvantaged children to have dental care. If there was no dental treatment provided by SDS, the overall school absence for dental reasons might be lower, as children would attend dentists outside school hours but the prevalence of school absence may be higher because of dental pain from untreated caries, as reported in other countries. And of course, social inequalities would have increased considerably because disadvantaged children had limited transport options, and their parents would lose wages or pay privately if they had to take their children to other dental services.

However, a shortcoming of SDS is that due to lack of resources, children only receive preventive treatment or general treatment for diseases identified in their annual school dental screening visit. Other dental problems, which arise after the school screening visit, have to be managed by their parents at local dental health services using the general dental care payment scheme that children are eligible for.

It was also noteworthy that private school children did not receive dental treatment by the SDS and they missed the least hours of schooling. They also had the lowest mean DMFT, and the highest average number of filled teeth of all groups which reflected their high utilization of dental services outside school time.

Dental care payment scheme and school absence

Dental care payment scheme was strongly associated with school absence for dental reasons, before and after adjustment for other explanatory factors. Children who were eligible for Thai government health care scheme (Children 0-15 years-old Health Care Scheme) who could utilize free dental service only during school time were twice as likely to have missed school as children who were using other schemes. Two points need to be made here. The first is the direct effect of the scheme. Being able to afford or receive free dental care outside school hours provided flexibility and encouragement to parents to take their children to dental clinics after school. Second, the dental care payment scheme was related to socioeconomic status of the parents. Children using the more flexible scheme or who could afford private clinics have more affluent parents; most of them have stable jobs in government, state enterprises or the private sector or had their own business, whereas many of their lower socioeconomic status counterparts were farmers or labourers. The economic situation of lower socioeconomic status children indirectly obliges them to rely on the SDS since it was inconvenient to access dental care via their dental care payment scheme. Although, disadvantaged

children could avoid school absence if they had dental visits on weekdays during school holidays, their parents who may have less independence within the context of their jobs to take time off from work may still incur a loss of income because the public dental clinics working hours overlapped with their working hours.

9.2 School absence for medical and social reasons

It was not surprising to find that dental reasons were a much lower cause of school absence than medical reasons. That finding refuted Hypothesis 2, namely that *The prevalence of school absence and school time loss for dental reasons (dental conditions and dental care) will be higher than for medical reasons among Grade 5 primary school children in Maung district, Lampang.*

Medical conditions were the cause for most school absences among children in this study population. The finding that medical conditions were common reasons for missing school confirms studies in Western countries (Silverstein et al 2001; Slack-Smith et al 2002; National Center for Education Statistics 2002; Roth-Isigkeit et al 2005). Most researches do not distinguish medical reasons from dental reasons or they do not compare medical with dental reasons in the same population. The findings that medical reasons were higher is most probably due to the fact that whereas children would stay home when ill they are likely to go to school when they have dental problems.

School time loss for social reasons in this study was also higher than for dental reasons. It was apparent that when children missed school for social reasons, they missed the whole school day. Second, school absences caused by social reasons are related to various factors that link to the dependent status of children at this young age. That was not measured in this study. These factors include parent' attitude to the importance of education, the availability of a care-giver that takes children to and from school if parents are ill or parents have to attend social events such as weddings or funerals. That raised the problem of who would look

after the child while the parent was away. More investigations taking these factors into consideration in relation to the prevalence of school absence due to social reason should be carried out.

9.3 Dental impacts from dental pain and dental discomfort

In the current study, dental pain and dental discomfort includes dental pain and discomfort from any tooth related conditions, such as sensitivity, erosion, trauma and exfoliation of primary teeth. They can lead to impacts on daily performances. The findings are compared to other relevant research either on oral or dental impacts.

Prevalence of dental pain and dental discomfort

Lifetime prevalence of dental pain and dental discomfort in the Lampang children was very high, 92.3%, in spite of the low caries levels in the Lampang area. The high prevalence is also surprising in the light of the low prevalence of absence from school due to dental pain. The prevalence was higher than that reported in other studies; in Sri Lanka, 49% of 8 year old children reported dental pain (Ratnayake and Ekanayake 2005). A lower prevalence; 31.8% was found among Australian children aged 12 years; (Slade et al 1996). The higher prevalence in this study may cause by the inclusion of both dental pain and dental discomforts as the measure and may also related to the discrepancy in DMFT, age of children as well as social and cultural environments (Slade 2001; Nomura et al 2004).

Prevalence of dental impacts from dental pain and dental discomfort

Many studies using different time frames reported that oral and dental impacts were very common in young children. The prevalence of impacts was 62% in Uganda (Astrom and Okullo 2003) and 74% in Sri Lanka (Ratnayake and Ekanayake 2005). In the present study, most children had impacts on at least one daily activity (83.2%) related to the most recent dental pain and dental discomfort experienced. This was very much in tune with that found in a recent study carried out in Thailand on a relatively comparable age group where oral impacts experienced during past 3 months on Thai schoolchildren was reported. There, 89.8% children had one or more impacts from oral conditions (Gherunpong et al 2004b). A possible explanation for this difference was the Gherunpong study included not only tooth but impacts of soft tissue origin such as ulcers, as well as aesthetic problems.

In this study the most common daily performance affected was eating (67.2%). The high percentage with impacts on eating is consistent with studies measuring dental impacts on children. In Thailand (72.9%) (Gherunpong et al, 2004), England (73.3%) (Shepherd et al, 1999) and Saudi Arabia (59.8%) (Stewart et al 2002). Eating related impacts were very prevalent, which conformed to a study in paedodontic patients in Canada that children had more functional limitations than impacts on emotional and social well-being (Jokovic et al 2002).

Despite the fact that oral impacts were prevalent in this population, the impacts were not severe. 5% of children experienced severe dental pain or dental discomfort from their most recent episode. With respect to intensity of impact, cleaning teeth and mouth and keeping good emotion had the most severe impacts; 2.8% and 1.7% respectively, while speaking clearly had the least severe impact (0.5%). The pattern of severity of impacts is somehow different than Gherunpong' study, however, the general picture is that they are not severe.

Association between socioeconomic status, demographic factors and dental impacts

The effect of the children's sex on the prevalence of dental impacts has not been extensively explored. Where it has, the findings of sex differences in prevalence of dental impacts have varied. In the Lampang population, no differences in impacts were found between females and males. That was consistent with a previous study in Thailand (Gherunpong et al 2004b). On the other hand a higher prevalence of oral impacts on sleeping was shown among Saudi females rather than males (Stewart et al 2002).

An interesting finding was that this study found socioeconomic status was associated with dental impacts (Tables 8.3). However, this association became non-significant after full adjustment (Table 8.5). Children of degree educated mothers and children who were studying at private schools were significantly less likely to have dental impacts. The reason for these differences may be the big socioeconomic status differences in the Lampang population. A study in New Zealand did not find an association between socioeconomic position and sociodental impacts in 12-13 year old children (Chen and Hunter 1996). However, a UK survey found the proportion of children having oral impacts was associated to socioeconomic status but the gradient was not consistent between different age groups of children (Nuttall et al 2006). For specific impacts, socially deprived children reported higher levels of aesthetic impacts from malocclusion (Mandall et al 2000).

Association between dental health status and dental impacts

The only independent predictor for dental impacts was number of decayed teeth before and after adjustment for all variables (Table 8.5). One reason for this finding could be that decayed teeth were the main cause of dental pain in most cases. There are not many other studies to compare our results with, but the

finding was relatively consistent with a survey in UK although the association was studied only in relation to impact on self confidence of the 12 year old children (Nuttall et al 2006) whereas the Lampang study measured the overall impact.

9.4 Conclusions

1. The level of school absence for dental related conditions and care was low per child but cumulatively was considerable. The main reason for school absence was medical reasons followed by social reasons and lastly dental reasons.
2. The prevalence of school absence for dental reasons was significantly lower in children from higher socioeconomic status than in those from lower socioeconomic households.
3. The prevalence of school absence for dental reasons was significantly higher in children who had poorer dental health status
4. The prevalence of school absence for dental reasons was significantly higher in children who studied at Municipal schools than in children who studied at Private schools.
5. The prevalence of dental impacts on daily performances was significantly higher in children who had poorer dental health status.
6. The school absence for medical and social reasons was very much higher than dental reasons.

9.5 Strengths and limitations of the study

Strengths of the study

1. One of the strengths of this study was the research design. It is the only study on this subject which used a detailed methodology which included a longitudinal study which was designed to assess the outcome by combining data from several sources. It used five sources of data: 1) clinical examinations, 2) children questionnaires, 3) parent questionnaires 4) specially designed school daily attendance registration 5) observation and records of dental care time provided by the School Dental Service. The numerous data sources helped the study to gather comprehensive sets of data. In addition, the data collected were detailed. For example, data of school absence was collected daily from the register with good support from class teachers. And it was collected and checked by the author every month. In order to prevent bias the time for dental service provided by School Dental Service was recorded on site by the researcher and her team and not by the local authorities. Furthermore, questionnaires for children and parents were pilot tested twice ensuring the psychometric appropriateness. The response rate for students was very good; 99.1% and for parent's questionnaire it was also exceptionally good (95.7%) because of the help from class teachers and children. In addition, kappa scores for the oral exams showed almost perfect consistency of each examiner and between examiners agreements and reproducibility of the data. Furthermore, test-retest reliability in answering questionnaires was quite high, which reinforces the internal validity of this study.
2. In addition, this study is one of the first to quantify the prevalence of school absence for dental reasons for one school year. This provides the exact data, not by extrapolating from short term collected data which may give inaccurate information. Data collection over a full year has

advantages in that it covers for seasonal and school examination period variation.

3. With regard to sample size, a large number of children and parents participated in the study. Schools were randomly selected, in order to provide a good representative sample of children.
4. By examining the associations between the outcome variables with social factors and dental health status in a single regression model, enabled us to obtain a better understanding of the combined effects of these variables, and to compare their predictive power.

Limitations of the study

Although this study has clearly identified strengths, there are also some weaknesses.

1. The children may not have correctly registered or reported reasons of absence to their teachers. A limited number of times children or the class teachers were not available to clarify questionable responses to the forms during double checking when the researcher collected the register forms from the school.
2. A number of questionnaires had missing values, none of which referred to the main outcome measures of the study (school absence for dental reasons, oral impacts on daily performances). However, those questionnaires were included in the analyses, as cases with missing values were excluded by analysis basis.
3. Finally, the measures of dental morbidity used in the study, namely dental pain and dental discomfort, were not consistent with other studies on school absence. Therefore comparison with other studies was difficult. However, the measures were chosen to cover the causes for school absence for dental reasons and they are not only dental pain, but can also be dental discomfort.

9.6 Recommendations for future research

This study assessing prevalence of school absenteeism due to dental reasons in Lampang, Thailand is the first investigation using prospective data for one academic year.

1. Further research is required to better explore the relationship between severity of dental conditions and the type and location of clinics and school absence for dental reasons to enable valid generalisations to be made.
2. This study should be replicated in other countries with different school dental health care policies.
3. An investigation of the impacts of dental disease and dentally related school absence on school performance of children should be carried out to see whether children who miss more school because of dental problems have poorer academic outcomes than their peers with less school absence.

9.7 Implications of findings for Oral Health Policy

1. This study provides useful data for the Health Promoting School Programme in Thailand, Ministry of Education and Ministry of Public Health. The Ministries should coordinate activities to reduce the prevalence of school absence due to dental reasons.
2. Local health authorities administering the SDS could consider providing dental services during lunch hours and after school or during school breaks. This would reduce the inequality of dental health access for disadvantaged children.
3. Schools should distinguish school absences for dental reasons from those for medical reasons.
4. At a national level, the number of school hours lost for dental reasons is considerable. Therefore, the data from this study should provide a much broader view of the problem over the whole country.

5. Oral health problems should be given a higher priority by policy makers. Even though most of dental problems are not life threatening they cause significant impacts on the quality of life of children and may affect schooling in general and their performance and thereby affect the future of the children.
6. Disadvantaged children had more oral health burdens related to dental illnesses. Oral health prevention and promotion should be reinforced among disadvantaged children from the very beginning of their contact with the SDS so that they shall spend less time for dental treatment from SDS programme.

9.8 Implications of findings for General Health Policy

1. Because health, dental and social problems clustered in the same group of lower socioeconomic people and the levels of school absenteeism for medical and social reasons reported in this study were high, more attention should be given to prevention and health promotion which addresses the social determinants of the social, medical and dental conditions.

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APPENDICES

Appendix 1

Daily school attendance form for assessing prevalence and reasons of school absence (English version)

student number	Date	Name & last name	Reason of absence (make a √in the box)					Place where the student is during absence (make a √in the box)		Number of school hours or days of absence	
			Dental visit	Dental Pain	Medical visit	Medical sickness	Others/ social	Sick bay	Not in school	hours	Days

Appendix 1

Daily School attendance form for assessing prevalence and reasons of school absence (Thai version)

แบบบันทึกข้อมูลการขาดเรียนของนักเรียน ตามงานวิจัยเรื่อง "ผลกระทบของการดูแลทันตสุขภาพต่อการขาดเรียนของเด็กนักเรียน"

โรงเรียน.....ชั้น.....เดือนที่เก็บข้อมูล.....

ลำดับที่	วัน เดือน ปี ที่บันทึก	ชื่อ- นามสกุล ของนักเรียนที่ขาดเรียน (ตัวบรรจง)	สาเหตุที่ขาดเรียน (โปรดทำเครื่องหมาย / ลงในช่อง)					สถานที่อยู่ของนักเรียน เมื่อขาดเรียน (โปรดทำเครื่องหมาย / ลงในช่อง)		จำนวนเวลาเรียนหรือจำนวนวันที่ขาดเรียน (ถ้าขาดเรียนไม่เต็มวัน ให้ระบุเป็นนาทีหรือชั่วโมง)		
			มีนัดทำฟัน หรือไปหาหมอฟัน	ปวดฟันหรือเจ็บป่วยเกี่ยวกับช่องปาก	มีนัดตรวจรักษากับแพทย์	เจ็บป่วยไม่สบายที่ไม่เกี่ยวกับช่องปาก	เหตุผลอื่นๆ ที่ไม่เกี่ยวข้องกับความเจ็บป่วย	พักที่ห้องพยาบาล	ไม่ได้มาโรงเรียน	นาที	ชั่วโมง	วัน

Appendix 2

Oral examination form

Name	Research number
Address:	Date of examination
Date of birth(D/M/Y):	Name of private dental clinic often go to:

Upper Rt Upper Lt

			55	54	53	52	51	61	62	63	64	65		
	17	16	15	14	13	12	11	21	22	23	24	25	26	27
crown														
Tx														

Lower Rt Lower Lt

			85	84	83	82	81	71	72	73	74	75		
	47	46	45	44	43	42	41	31	32	33	34	35	36	37
crown														
Tx														

Primary teeth	Permanent teeth	STATUS	Treatment
A	0	- Sound	0 = none
B	1	- Decayed	P =Preventive,caries arrested care
C	2	- Filled with decay	F = Fissure sealant
D	3	- Filled, no decay	1 = one surface filling
E	4	- Missing as a result of caries	2 = Two or more surface filling
-	5	- Missing, any other reason	3 = Crown for any reason
F	6	- Fissure sealant	4 = Veneer or laminate
G	7	- Bridge abutment, special crown or veneer/implant	5 = pulp care and restoration 6 = Extraction
-	8	- Unerupted tooth, (crown)	7 = Need for other care
T	T	-Trauma (fracture)	
-	9	- Not recorded	

Appendix 3

Criteria for DMFT examination*

*source: WHO 1997

The criteria for diagnosis and coding (primary tooth codes within parentheses) are:

0 (A) *Sound crown.* A crown is recorded as sound if it shows no evidence of treated or untreated clinical caries. The stages of caries that precede cavitation, as well as other conditions similar to the early stages of caries, are excluded because they cannot be reliably diagnosed. Thus a crown with the following defects, in the absence of other positive criteria, should be coded as sound:

- white or chalky spots;
- discoloured or rough spots that are not soft to touch with a metal CPI probe;
- stained pits or fissures in the enamel that do not have visual signs of undermined enamel, or softening of the floor or walls detectable with a CPI probe;
- dark, shiny, hard, pitted areas of enamel in a tooth showing signs of moderate to severe fluorosis;
- Lesions that, on the basis of their distribution or history, or visual/tactile examination, appear to be due to abrasion.

1 (B) *Decayed root.* Caries is recorded as present when a lesion in a pit or fissure, or on a smooth tooth surface, has an unmistakable cavity, undermined enamel, or a detectable softened floor or wall. A tooth with a temporary filling, or one which is sealed (code 6 (F)) but also decayed, should also be include in this category. In cases where the crown has been destroyed by caries and only the root is left, the caries is judged to have, the caries is judged to have originated on the crown and therefore scored as crown caries only. The CPI probe should be used to confirm visual evidence of caries on the occlusal, buccal and lingual surfaces. Where any doubts exists, caries should not be recorded as present.

2 (C) *Filled crown, with decay.* A crown is considered filled, with decay, when it has one or more permanent restorations and one or more areas that are decayed. No distinction is made between primary and secondary caries (i.e. the same code applies whether or not the carious lesion are in physical association with the restoration (s)).

3 (D) *Filled crown, with no decay.* A crown is considered filled, without decay, when one or more permanent restorations are present and there is no caries anywhere on the crown. A tooth that has been crowned because of previous decay is recorded in this category. (A tooth that has been crowned for reasons other than decay, e.g. a bridge abutment, is coded 7 (G)).

4 (E) *Missing tooth, as a result of caries.* This code is used for permanent or primary teeth that have been extracted because of caries and is recorded under coronal status. For missing primary teeth, this score should be used only if the subject is at an age when normal exfoliation would not be a sufficient explanation for absence.

Note: In some age groups, it may be difficult to distinguish between unerupted teeth (code 8) and missing teeth (codes 4 and 5). Basic knowledge of tooth eruption patterns, the appearance of the alveolar ridge in the area of the tooth space in question, and the caries status of other teeth in the mouth may provide helpful clues in making a differential diagnosis between unerupted and extracted teeth. Code 4 should not be used for teeth judged to be missing for any reason other than caries.

5 (-) *Permanent tooth missing, for any other reason.* This code is used for permanent teeth judged to be absent congenitally, or extracted for orthodontic reasons or because or periodontal disease, trauma, etc.

6 (F) *Fissure sealant.* This code is used for teeth in which a fissure sealant has been placed on the occlusal fissure has been enlarged with a rounded or "flame-

shaped" bur, and a composite material placed. If a tooth with a sealant has decay, it should be code as 1 or B.

7 (G) *Bridge abutment, special crown or veneer.* This code is used under coronal status to indicate that a tooth forms part of a fixed bridge, i.e. is a bridge abutment. This code can also be used for crowns placed for reasons other than caries and for veneers or laminates covering the labial surface of a tooth on which there is no evidence of caries or a restoration.

Note: Missing teeth replaced by bridge pontics are coded 4 or 5 under coronal status.

8 (-) *Unerupted crown.* This classification is restricted to permanent teeth and used only for a tooth space with an unerupted permanent tooth but without a primary tooth. Teeth scored as unerupted are exclude from all calculations concerning dental caries. This category does not include congenitally missing teeth, or teeth lost as a result of trauma, etc. For differential diagnosis between missing and unerupted teeth, seen code 5.

T (T) *Trauma (fracture).* A crown is scored as fractured when some of its surface is missing as a result of trauma and there is no evidence of caries.

9 (-) *Not recorded.* This code is used for any erupted permanent tooth that cannot be examined for any reason (e.g. because or orthodontic bands, severe hypoplasia, etc.).

Appendix 4

Questionnaire for schoolchildren (English version)

Research Number.....

This is not a test. There is no right or wrong answer. Feel free and enjoy answering it. We are only interested in your opinion. Your answers are very important because they will help dentists understand the concerns of children. This may improve better health care plan for children in the future.
Your answers will be *kept **confidential*** by the study team. Neither your teachers nor parents will see them.
This questionnaire contains 4 parts and it should take you 30 minutes to complete.
The staff will read each question one by one out loud for you to follow. To answer the questions, please follow the instruction. In most questions, you will be asked to put a √in the box in front of the answer that best fits you.
For example:

Do you drink fresh water everyday?
☑Yes □No

In some questions, a blank space is given for you to write your answer, for example:
How many time have you had tooth pain in your whole life?
2 times

If any of the options in a given question is followed by the expression **"Go to question ..."** it means that you should go straight to the question stated. If there is nothing given, you just follow order of questions. For example:

1. Were you born in Lampang province?
   □Yes □No (go to question 3)

2. Of which district in Lampang province were you born in?
   I was born in .....District

3. Have you ever visited to Elephant Conservative Centre?
   □Yes □No

If your answer in Question 1 is **No**, you should skip question 2 and go straight to question 3
If your answer is **Yes**, you should answer question 2 and then 3 respectively.

Please answer it as best as you can. If you have any doubt, please feel free to ask any staff member at any time.

☺ ☺ ☺ THANK YOU ☺ ☺ ☺

Part I **First we would like to know your general information**

Firstname_____Lastname_____

Identification Number in Class _____

Class Level_____ School name_____

School Type □ Public School □ Municipal school □ Private school

Date of birth: ___/___/_____/ dd/mm/year

Sex: □ Boy □ Girl

Part II

Now we would like to ask you about <u>dental pain and dental discomfort.</u>

Dental pain = when you have pain because of a tooth problem, pain from cavities, pain from gum boiled, pain from tooth broken, pain from loosing tooth

Dental discomfort = any problem with your teeth, i.e. discomfort from chewing, eating cold or hot foods, discomfort after treatment, discomfort from loosing tooth

1. Have you ever had dental pain or dental discomfort in your lifetime?

□ Yes □ No

2. Now, could you choose one of the words from the options below which best describe your last dental pain or dental discomfort?

□ Mild
□ Moderate
□ Very bad
□ Extremely bad
□ Cannot remember

3. Now I would like to know how long did the pain last each time?

□ Very short time
□ Less than 1 hour
□ About an hour
□ All day time
□ All night time
□ All day and all night
□ Cannot remember

Question 4-11*: From the list of your daily life activities below, we would like you to choose Yes or No for each activity that you felt that it was effected by your last dental pain or dental discomfort by putting a √ in the box in front of your answer. *If your answer is Yes, please indicate the degree of effect.

Daily Activities	Did the dental pain of discomfort effect this activity	Degree of severity (Please put a √in the box)		
		Mild	Moderate	Severe
4. Eating i.e. Ice-cream, sweet foods, hot or cold drinks, biting foods	□Yes →→			
	□No			
5.Speaking i.e. speaking clearly	□Yes →→			
	□No			
6. Cleaning your mouth i.e. rinsing your mouth, brushing your teeth	□Yes →→			
	□No			
7. Sleeping	□Yes →→			
	□No			
8. Maintaining emotion i.e. maintain your usual emotional state without being irritable	□Yes →→			
	□No			
9. Smiling	□Yes →→			
	□No			
10. Studying i.e. going to school, reading books, doing homework.	□Yes →→			
	□No			
11. Social Contact i.e going out with friends, visiting friend's house	□Yes →→			
	□No			

Now we would like to ask about the duration of your dental pain or dental discomfort you may have experienced

12. Do you have any dental pain or dental discomfort, **Today**?

□ Yes □ No □ Cannot remember

13. **In the past 7 days**, have you ever had any dental pain or dental discomfort?

□ Yes, I had the pain or discomfort for.....hours or .....days,
and it made me missed school for.....hours or .....days
□ Yes, I had the pain or discomfort for.....hours or .....days,
but it have not made me missed school
□ No
□ Cannot remember

14. **In the past 1 month**, have you ever had any dental pain or dental discomfort?

□ Yes, I had the pain or discomfort for.....hours or .....days,
and it made me missed school for.....hours or .....days
□ Yes, I had the pain or discomfort for.....hours or .....days,
but it have not made me missed school
□ No
□ Cannot remember

15. **In the past 3 months**, have you ever had any dental pain or dental discomfort?

□ Yes, I had the pain or discomfort for.....hours or .....days,
and it made me missed school for.....hours or .....days
□ Yes, I had the pain or discomfort for.....hours or .....days,
but it have not made me missed school
□ No
□ Cannot remember

16. **In the past 6 months**, have you ever had any dental pain or dental discomfort?

□ Yes, I had the pain or discomfort for.....hours or .....days,
and it made me missed school for.....hours or .....days
□ Yes, I had the pain or discomfort for.....hours or .....days,
but it have not made me missed school
□ No
□ Cannot remember

Part III **Now we would like to ask you about the School Dental Service in your school**

17. How does your school provide school dental service?

□ Nurses examine my body and also my mouth at school and give me an inform letter to my parent, the letter suggesting my parent to take me to clinic
□ Dentists/dental nurses examine my mouth and give dental service at school
□ Dentists/dental nurses examine my mouth at school and take me or appoint me to clinic
□ There is no service at all

18. Since the beginning of this school year have you ever left the classroom to take part in dental school service?

□ Yes □ No

Now we would like to ask about your dental care

19. When did your last have dental visit?

□ Never been to dentist in my lifetime (go to question 26)
□ Within 1 week
□ Within 1 month
□ Within 6 months
□ Over 6 months
□ Cannot remember

20. What type of dental service do you most frequently use? Please answer only one type?

□ Private dental clinic
□ Dental clinic at private hospital
□ Dental clinic at public hospital
□ Dental clinic in health station
□ Dental clinic of School Dental Service
□ Others, please specify_____

21. When do you usually have dental care at dental Clinic in Question 20?

□ During school time
□ Not during school time
□ Both during school time and not during school time

22. Have you ever missed school or asked for permission to go to dental clinic which is not dental school clinic in your lifetime?

□Yes □ No (go to Question 24)

23. What was the main reason that brought you to the dentist during school time when you had your teeth treated at your most recent visit?

□ For dental check up
□ Pain / tooth problem
□ Gum swelling
□ General treatment i.e. filling, scaling, tooth extraction
□ I had appointment for consecutive treatment i.e. orthodontic treatment or root treatment.
□ Others, please specify_____
□ Cannot remember

Now we would like to ask you about event <u>in the past 1 months</u>

24. **<u>In the past 1 month,</u>** have you ever had any dental visits that was not with the your School Dental Service?

□ Yes, I had dental visit and it made me miss school for……hours or ……days
□ No
□ Cannot remember

25. **<u>In the past 1 month,</u>** have you ever had bleeding problem after tooth extraction that made you missed school?

□ Yes, I had bleeding problem after tooth extraction
and it made me missed school for……hours or ……days
□ Yes, I had bleeding problem after tooth extraction but it did not made me missed school
□ No
□ Cannot remember

26. **<u>In the past 1 month</u>**, have you ever had oral ulcer that made you missed school?

□ Yes, I had oral ulcer and it made me missed school for……hours or ……days
□ Yes, I had oral ulcer but it did not made me missed school
□ No
□ Cannot remember

Part IV **Now we would like to ask you about <u>other reasons</u> of missing school within the past 1 month**

27. **<u>In the past 1 month,</u>** have you ever missed school because of you were ill and went to see a doctor?

□ Yes, and it made me missed school for……hours or ……days
□ No
□ Cannot remember

28. **<u>In the past 1 month,</u>** have you ever missed school because of you were ill and rested at home?

□ Yes, and it made me missed school for……hours or ……days
□ No
□ Cannot remember

29. **<u>In the past 1 month,</u>** have you ever missed school because of you were ill and rested at sickbay?

□ Yes, and it made me miss school for……hours or ……days
□ No
□ Cannot remember

30. **In the past 1 month,** have you ever missed school because of you participated family's events, i.e. went to a wedding or funeral, helped your parent with housework, looked after of sick family members, visiting relatives, went to a vacation?

□ Yes, and it made me miss school for.....hours or .....days
□ No
□ Cannot remember

Part V

Now I would like to ask you about other pains that you may have experienced in the past 1 month

31. **In the past 1 month,** have you ever missed school because of you had headache?

□ Yes, and it made me missed school for.....hours or .....days
□ No
□ Cannot remember

32. **In the past 1 month,** have you ever missed school because of you had stomachache?

□ Yes, and it made me missed school for.....hours or .....days
□ No
□ Cannot remember

33. **In the past 1 month,** have you ever missed school because of you had earache?

□ Yes, and it made me missed school for.....hours or .....days
□ No
□ Cannot remember

This is the end of the questionnaire. Thank you very much for answering questionnaire! Please, check whether you have answered completely. After finish checking, please raise your hand. The staff will collect the questionnaire from you.

☼☺ ☺ **Best wishes for your future.** ☺ ☺☼

Appendix 4

Questionnaire for schoolchildren (Thai version)

แบบสอบถามสำหรับนักเรียนเกี่ยวกับการขาดเรียนเนื่องจากปัญหาฟัน

แบบสอบถามนี้ไม่ใช่ข้อสอบ ไม่มีคำตอบใดถูกหรือผิด เจ้าหน้าที่เพียงต้องการทราบข้อมูลและความคิดเห็นของนักเรียนเท่านั้น แต่ขอให้นักเรียนตั้งใจตอบตามความเป็นจริงเพราะคำตอบของนักเรียนจะมีประโยชน์ นำไปใช้ในการจัดระบบบริการทันตกรรมแก่นักเรียนต่อไป คำตอบของนักเรียนจะถูกเก็บเป็นความลับ เจ้าหน้าที่จะไม่นำไปบอกให้คุณครูหรือผู้ปกครองทราบ

แบบสอบถามนี้มี 5 ตอน ใช้เวลาประมาณ 30 นาทีในการตอบคำถาม

วิธีทำแบบสอบถาม : ขอให้นักเรียนทำตามขั้นตอนที่เจ้าหน้าที่แนะนำ

เช่น เขียนเครื่องหมาย √ลงในช่อง □ ให้ตรงตามความเป็นจริงหรือเขียนคำตอบลงในช่องว่างที่กำหนดให้

ตัวอย่าง: *นักเรียนดื่มน้ำสะอาดทุกวันใช่หรือไม่*

□*ใช่* □*ไม่ใช่*

ในบางคำถาม จะมีช่องว่างไว้ให้นักเรียนเติมคำตอบลงไป เช่น

ตั้งแต่เกิดมานักเรียนเคยปวดฟันกี่ครั้ง ***2 ครั้ง***

และนักเรียนอาจต้องข้ามคำถามบางข้อ ถ้าท้ายคำตอบที่นักเรียนเลือกมีข้อความปรากฏว่า **"ข้ามไปข้อ....."** ให้นักเรียนจงไปตอบคำถามตามข้อที่ระบุไว้ นอกจากนั้นให้ตอบคำถามเรียงตามลำดับข้อตามปกติ

ตัวอย่าง

1. นักเรียนเกิดที่จังหวัดลำปางใช่หรือไม่

□*ใช่* □*ไม่ใช่ (ข้ามไปข้อ 3)*

2. นักเรียนเกิดที่อำเภอใดของจังหวัดลำปาง

อำเภอ.....

3. นักเรียนเคยไปเที่ยวศูนย์อนุรักษ์ช้างไทยหรือไม่

□*เคย* □*ไม่เคย*

สมมติว่าในคำถามข้อ 1 นักเรียนตอบว่า **ไม่ใช่** นักเรียนไม่ต้องตอบคำถามข้อ 2 แต่ให้ไปตอบข้อ 3 ได้เลย แต่ถ้านักเรียนตอบว่า **ใช่** ให้นักเรียนตอบคำถามข้อ 2 ก่อน แล้วจึงไปตอบข้อ 3 ตามลำดับ

ถ้านักเรียนมีข้อสงสัยใดๆ ในระหว่างทำแบบสอบถาม สามารถยกมือถามเจ้าหน้าที่ได้ตลอดเวลานะคะ

☼☺ ☺ ขอบคุณค่ะ ☺ ☺☼

ตอนที่ 1

ข้อมูลทั่วไป เลขที่วิจัย.....

ชื่อ-นามสกุล.....

เลขที่ในชั้น.....ชั้น ป 6 /.....

ชื่อโรงเรียน.....

ประเภทโรงเรียน □ รัฐ □ เอกชน □ เทศบาล

เกิด วันที่.....เดือน..... .....พ. ศ. .....

เพศ □ชาย □หญิง

ตอนที่ 2 **คำถามเกี่ยวกับการปวดฟันและปัญหาฟันอื่นๆที่นักเรียนเคยประสบ**

คำอธิบาย: **อาการปวดฟัน** หมายถึง อาการปวดเนื่องจากปัญหาฟัน ฟันผุจนปวด เหงือกบวมเป็นหนอง ฟันหัก/โยกจนปวด

อาการไม่สบายเนื่องจากฟันเป็นสาเหตุ หมายถึง อาการเสียวฟันเมื่อรับประทานอาหารร้อนหรือเย็น เคี้ยวอาหารไม่สะดวก อาการรู้สึกไม่สบายหลังทำฟัน เสียวฟันหลังทำฟัน ฟันโยก

1. ตั้งแต่เกิดมานักเรียนเคยปวดฟันหรือมีปัญหาเกี่ยวกับฟันหรือไม่

□เคย □ไม่เคย (ไม่ต้องตอบข้อ 2-11 ให้ข้ามไปข้อ 12ได้เลย)

2. คำตอบใดที่บรรยายอาการปวดฟัน หรืออาการไม่สบายเพราะฟันเป็นสาเหตุที่นักเรียนมีครั้งล่าสุด

□เล็กน้อย

□ปานกลาง

□รุนแรง

□รุนแรงมากๆ

□จำไม่ได้

3. อาการปวดฟันหรืออาการไม่สบายเพราะฟันเป็นสาเหตุที่นักเรียนมีครั้งล่าสุด นานเพียงใด

□ประเดี๋ยวเดียว

□น้อยกว่าครึ่งวัน

□ตลอดเวลากลางวัน

□ตลอดกลางคืน

□ตลอดทั้งกลางวันและกลางคืน

□มากกว่า 1 วัน

□จำไม่ได้

ข้อ 4-11 จากการที่นักเรียนเคยมีอาการปวดฟัน หรืออาการไม่สบายเนื่องจากฟันเป็นสาเหตุ ขอให้นักเรียนทำเครื่องหมาย √ลงในช่องที่ตรงกับความคิดเห็นของนักเรียนว่า อาการปวดฟัน หรืออาการไม่สบายเนื่องจากฟันเป็นสาเหตุของนักเรียนครั้งล่าสุด รบกวนกิจกรรมในชีวิตประจำวัน ต่อไปนี้ หรือไม่ และมีระดับการรบกวนมากน้อยเพียงใด แต่ถ้าอาการปวดฟัน หรืออาการไม่สบายเนื่องจากฟันเป็นสาเหตุนั้น ไม่รบกวนกิจกรรมข้อนั้น นักเรียน ไม่ต้องบอกระดับของการรบกวน ให้ตอบข้อถัดไปได้เลย

กิจกรรม	อาการปวดฟันหรืออาการไม่สบายเนื่องจากฟันของนักเรียนรบกวนกิจกรรมนี้ใช่หรือไม่	ระดับของการรบกวน (ให้นักเรียนทำ เครื่องหมาย √ลงในช่อง)		
		เล็กน้อย	ปานกลาง	รุนแรง
4. การรับประทานอาหาร (เช่น ข้าว ไอศกรีม น้ำหวาน น้ำเย็น กัดอาหาร)	☐ใช่ →			
	☐ไม่ใช่			
5. การพูดได้ตามปกติชัดเจน	☐ใช่ →			
	☐ไม่ใช่			
6. การทำความสะอาดช่องปาก เช่นบ้วนปาก, แปรงฟัน)	☐ใช่ →			
	☐ไม่ใช่			
7. การนอนหลับและพักผ่อน	☐ใช่ →			
	☐ไม่ใช่			
8.การรักษาอารมณ์โดยไม่หงุดหงิด รำคาญใจ	☐ใช่ →			
	☐ไม่ใช่			
9. การยิ้ม หัวเราะ	☐ใช่ →			
	☐ไม่ใช่			
10. การศึกษา เช่น การไปโรงเรียน เรียนหนังสือ การทำการบ้าน	☐ใช่ →			
	☐ไม่ใช่			
11. การติดต่อออกไปพบเจอกับคนอื่นๆ (เช่นไปเที่ยวกับเพื่อน/ครอบครัว ไปบ้านเพื่อน)	☐ใช่ →			
	☐ไม่ใช่			

คำถามเกี่ยวกับระยะเวลาที่นักเรียนเคยมี อาการปวดฟัน หรืออาการไม่สบายเนื่องจากฟันเป็นสาเหตุ

12. ในวันนี้ นักเรียนมีอาการปวดฟัน หรืออาการไม่สบายเนื่องจากฟันเป็นสาเหตุใช่หรือไม่

☐ใช่ ☐ไม่ใช่ ☐จำไม่ได้

13. <u>ใน 1 สัปดาห์ที่ผ่านมา (ตั้งแต่ 2547ถึง 2547)</u>นักเรียนมีอาการปวดฟัน หรือ อาการไม่สบายเนื่องจากฟันเป็นสาเหตุใช่หรือไม่

□ใช่ มีอาการเป็นเวลา.....ชั่วโมง หรือ .....วัน.และทำให้ขาดเรียนเป็นเวลา .....ชั่วโมง หรือ .....วัน.

□ใช่ มีอาการเป็นเวลา.....ชั่วโมง หรือ .....วัน แต่ไม่ทำให้ขาดเรียน

□ไม่ใช่

□จำไม่ได้

14. <u>ใน 1 เดือนที่ผ่านมา (ตั้งแต่ 2547ถึง 2547)</u> นักเรียนมีอาการปวดฟัน หรือ อาการไม่สบายเพราะฟันเป็นสาเหตุ และทำให้ขาดเรียนใช่หรือไม่

□ใช่ มีอาการเป็นเวลา.....ชั่วโมง หรือ .....วัน.และทำให้ขาดเรียนเป็นเวลา .....ชั่วโมง หรือ .....วัน.

□ใช่ มีอาการเป็นเวลา.....ชั่วโมง หรือ .....วัน แต่ไม่ทำให้ขาดเรียน

□ไม่ใช่

□จำไม่ได้

15. <u>ใน 3 เดือนที่ผ่านมา (ตั้งแต่ 2547ถึง 2547)</u>นักเรียนมี อาการปวดฟัน หรือ อาการไม่สบายเพราะฟันเป็นสาเหตุ และทำให้ขาดเรียน ใช่หรือไม่

□ใช่ มีอาการเป็นเวลา.....ชั่วโมง หรือ .....วัน.และทำให้ขาดเรียนเป็นเวลา .....ชั่วโมง หรือ .....วัน.

□ใช่ มีอาการเป็นเวลา.....ชั่วโมง หรือ .....วัน แต่ไม่ทำให้ขาดเรียน

□ไม่ใช่

□จำไม่ได้

16. <u>ใน 6 เดือนที่ผ่านมา (ตั้งแต่ 2547ถึง 2547)</u>นักเรียนมี อาการปวดฟัน หรือ อาการไม่สบายเพราะฟันเป็นสาเหตุ และทำให้ขาดเรียน ใช่หรือไม่

□ใช่ มีอาการเป็นเวลา.....ชั่วโมง หรือ .....วัน.และทำให้ขาดเรียนเป็นเวลา .....ชั่วโมง หรือ .....วัน.

□ใช่ มีอาการเป็นเวลา.....ชั่วโมง หรือ .....วัน แต่ไม่ทำให้ขาดเรียน

□ไม่ใช่

□จำไม่ได้

ตอนที่ 3 **คำถามเกี่ยวกับการรับบริการทางทันตกรรมของนักเรียน**

คำอธิบาย:

<u>การทำฟัน</u> หมายถึง การรับการดูแลรักษาสุขภาพช่องปาก ได้แก่ การอุดฟัน ถอนฟัน ขูดหินปูน ขัดฟัน เคลือบหลุมร่องฟัน เคลือบฟลูออไรด์ รักษารากฟัน ใส่ครอบฟัน จัดฟัน ฯลฯ

<u>ทันตกรรมโรงเรียน</u> หมายถึง มีหมอฟัน / หรือ เจ้าหน้าที่ มาให้บริการตรวจ และ/ หรือ ทำฟันที่โรงเรียน หรือ รับ /นัด นักเรียนไปทำฟัน ที่สถานบริการ

ต่อไปเป็นคำถามเกี่ยวกับทันตกรรมโรงเรียน

17. โรงเรียนของนักเรียนมีการให้บริการตรวจ และ/ หรือทำฟันที่โรงเรียนอย่างใดบ้าง

□หมอมาตรวจร่างกาย และ ตรวจฟันด้วย และ แล้วแนะนำให้ผู้ปกครองพาไปทำฟันเอง

□หมอมาตรวจฟันโดยเฉพาะและมาทำฟันให้ที่โรงเรียน

□หมอมาตรวจฟันโดยเฉพาะและมารับหรือนัดให้ไปทำฟันที่สถานบริการ

□ไม่มีบริการใดๆเลย

18. <u>ตั้งแต่เปิดภาคเรียนนี้มา</u> นักเรียนเคยออกจากห้องเรียนหรือไม่ต้องเรียนเพื่อไปตรวจฟันหรือทำฟันกับโครงการทันตกรรมโรงเรียนหรือไม่

□เคย □ไม่เคย

ต่อไปเป็นคำถามเกี่ยวกับการตรวจฟันหรือทำฟันทุกประเภท

19. นักเรียนได้รับการตรวจฟันหรือทำฟันครั้งสุดท้ายเมื่อใด

□ตั้งแต่เกิดมาไม่เคยได้รับการตรวจฟันหรือทำฟันเลย (ข้ามไปข้อ 26) □ภายใน 1 สัปดาห์ที่ผ่านมา

□ภายใน 1 เดือนที่ผ่านมา □ภายใน 6 เดือนที่ผ่านมา

□ผ่านมาเกิน 6 เดือน □จำไม่ได้

20. จงบอกประเภทของคลินิกทำฟันที่นักเรียนไปใช้บริการบ่อยที่สุด(ตอบเพียง 1 คำตอบ)

□คลินิกทำฟันเอกชน □คลินิกทำฟันในโรงพยาบาลเอกชน

□คลินิกทำฟันในโรงพยาบาลของรัฐ □คลินิกทำฟันของสถานีอนามัย

□คลินิกทำฟันของโครงการทันตกรรมโรงเรียน □อื่นๆ โปรดระบุ_____

21. ส่วนใหญ่นักเรียนไป ตรวจฟันหรือทำฟัน กับคลินิกในข้อ 20 ในช่วงเวลาใด

□ในเวลาเรียน □นอกเวลาเรียน □ทั้งในเวลาเรียนและนอกเวลาเรียน

22. <u>ตั้งแต่เกิดมา</u>นักเรียนเคยขาดเรียนหรือขออนุญาตคุณครู เพื่อไปตรวจฟันหรือทำฟันในเวลาเรียนกับ<u>คลินิกที่ไม่ใช่คลินิกทันตกรรมโรงเรียน</u>ใช่หรือไม่

□ใช่ □ไม่ใช่ (ข้ามไปข้อ 24)

23. อะไรเป็นสาเหตุที่ทำให้นักเรียนขาดเรียนหรือขออนุญาตคุณครูไปทำฟัน**ในเวลาเรียน**กับ<u>คลินิกที่ไม่ใช่คลินิกทันตกรรมโรงเรียน</u>ครั้งล่าสุด

□ไปตรวจฟัน □ปวดฟัน

□เหงือกบวม □ไปทำฟันทั่วๆไป เช่นอุดฟัน ขูดหินปูน ถอนฟัน

□ไปตามหมอนัด เพื่อการรักษาต่อเนื่อง เช่น จัดฟัน รักษารากฟัน

□อื่นๆ โปรดระบุ_____ □จำไม่ได้

ต่อไปเป็นคำถามเกี่ยวกับเหตุการณ์ใน 1 เดือนที่ผ่านมา (ตั้งแต่ 2547ถึง 2547)

24. ใน 1 เดือนที่ผ่านมา นักเรียนเคยขาดเรียนเนื่องจากไปตรวจฟันหรือทำฟันที่คลินิกทำฟันซึ่งไม่ใช่คลินิกของโครงการทันตกรรมโรงเรียน ใช่หรือไม่

□ใช่ และทำให้ขาดเรียนเป็นเวลา.....ชั่วโมง หรือ .....วัน

□ไม่ใช่

□จำไม่ได้

25. ใน 1 เดือนที่ผ่านมา นักเรียนเคย มีเลือดออกผิดปกติภายหลังการถอนฟัน และทำให้ขาดเรียนใช่หรือไม่

□ใช่ เคย มีอาการ และทำให้ขาดเรียนเป็นเวลา .....ชั่วโมง หรือ .....วัน

□ใช่ เคยมีอาการแต่ไม่ทำให้ขาดเรียน

□ไม่ใช่

□จำไม่ได้

26.ใน 1 เดือนที่ผ่านมา นักเรียนเคยขาดเรียนเนื่องจากปวดแผลร้อนในหรือ แผลในปากและทำให้ขาดเรียนใช่หรือไม่

□ใช่ เคย มีอาการ และทำให้ขาดเรียนเป็นเวลา .....ชั่วโมง หรือ .....วัน

□ใช่ เคยมีอาการแต่ไม่ทำให้ขาดเรียน

□ไม่ใช่

□จำไม่ได้

ตอนที่ 4 **คำถามเกี่ยวกับการขาดเรียนเนื่องจากปัญหาอื่นๆที่ไม่ใช่ปัญหาสุขภาพช่องปากในช่วง 1 เดือนที่ผ่านมา (ตั้งแต่ 2547ถึง 2547)**

27. ใน 1 เดือนที่ผ่านมา นักเรียนเคยขาดเรียนเนื่องจากป่วยและต้องไปพบแพทย์ ใช่หรือไม่

□ใช่ และทำให้ขาดเรียนเป็นเวลา.....ชั่วโมง หรือ .....วัน

□ไม่ใช่

□จำไม่ได้

28. ใน 1 เดือนที่ผ่านมา นักเรียนเคยขาดเรียนเนื่องจากป่วยและนอนพักอยู่ที่บ้าน (ไม่ต้องไปพบแพทย์) ใช่หรือไม่

□ใช่ และทำให้ขาดเรียนเป็นเวลา.....ชั่วโมง หรือ .....วัน

□ไม่ใช่

□จำไม่ได้

29. ใน 1 เดือนที่ผ่านมา นักเรียนเคยขาดเรียนเนื่องจากป่วยและนอนพักที่ห้องพยาบาลของโรงเรียน ใช่หรือไม่

□ใช่ และทำให้ขาดเรียนเป็นเวลา.....ชั่วโมง หรือ .....วัน

□ไม่ใช่

□จำไม่ได้

30. **<u>ใน 1 เดือนที่ผ่านมา</u> นักเรียนเคยขาดเรียนเนื่องจากไปร่วมกิจกรรมของครอบครัว เช่น ไปงานแต่งงาน ไปงานศพ ช่วยผู้ปกครองทำงานบ้าน ดูแลสมาชิกครอบครัวที่ป่วย ไปเยี่ยมญาติ ไปพักผ่อน-ตากอากาศ ฯลฯ ใช่ หรือไม่**

□ใช่ และทำให้ขาดเรียนเป็นเวลา.....ชั่วโมง หรือ .....วัน

□ไม่ใช่

□จำไม่ได้

ตอนที่ 5 **คำถามเกี่ยวกับ<u>การขาดเรียนเนื่องจากอาการปวดอื่นๆที่นักเรียนเคยมีใน</u><u>ระยะเวลา 1 เดือนที่ผ่านมา</u>**

31. **ใน 1 เดือนที่ผ่านมา นักเรียนเคยขาดเรียนเนื่องจากปวดศีรษะ ใช่หรือไม่**

□ใช่ และทำให้ขาดเรียนเป็นเวลา.....ชั่วโมง หรือ .....วัน

□ไม่ใช่

□จำไม่ได้

32. **ใน 1 เดือนที่ผ่านมา นักเรียนเคยขาดเรียนเนื่องจากปวดท้อง ใช่หรือไม่**

□ใช่ และทำให้ขาดเรียนเป็นเวลา.....ชั่วโมง หรือ .....วัน

□ไม่ใช่

□จำไม่ได้

33. **ใน 1 เดือนที่ผ่านมา นักเรียนเคยขาดเรียนเนื่องจากปวดหู ใช่หรือไม่**

□ใช่ และทำให้ขาดเรียนเป็นเวลา.....ชั่วโมง หรือ .....วัน

□ไม่ใช่

□จำไม่ได้

แบบสอบถามสิ้นสุดเพียงเท่านี้ ขอบคุณนักเรียนมากที่ให้ความร่วมมือในการตอบแบบสอบถาม โปรดตรวจสอบอีกครั้งว่าได้ตอบคำถามครบถ้วน เมื่อเสร็จแล้วให้นักเรียนยกมือขึ้น จะมีเจ้าหน้าที่ไปเก็บแบบสอบถามจากนักเรียน ☼☺ ☺ขอให้นักเรียนประสบความสำเร็จในการเรียน ☺ ☺☼

Appendix 5

Questionnaire for parent and guardian (English version)

Research number.....

By answering this questionnaire, you will help us find out more about school absence because of dental health problems in your town.
This may help to provide a better health care plan for children in the future.

This questionnaire will take you about 20 minutes to finish,
There are 5 parts to this questionnaire.

Your answers will be kept confidential by the study team.
Therefore please answer the questionnaire as accurately as possible.

To answer the questions, please follow the instruction given. In most questions, you will be asked to put a √in the box front of the answer that best fits you.
For example:

Does your child play any sports?
☑ Yes ☐ No

In some questions, a blank space is given for you to write your answer, for example:
What is your child most favorite sports, please specify, Football

Please read each question carefully and answer as best as you can.

☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺

Part I

First of all, we would like to ask about your child general information

Name of child.....
Class.....School.....

1. What is your relationship to the child?
☐ Father
☐ Mother
☐ Other, please specify: e.g. Step parent, uncle, aunt, brother, sister, grandparents etc.).....

2. What is the occupation of the child's parent? (If you are either father or mother please answer only 2.1, 2.2, if you are not please answer all 2.1, 2.2 and 2.3)

2.1 Father

☐ Government officer/ State Enterprise	☐ Non-government officer
☐ Businessman	☐ Agricultural worker
☐ Labour worker	☐ does not work
☐ Other, please specify_____	☐ do not know
☐ Passed away	

2.2 Mother

☐ Government officer/ State Enterprise	☐ Non-government officer
☐ Businessman	☐ Agricultural worker
☐ Labour worker	☐ House wife/does not work
☐ Other, please specify_____	☐ do not know
☐ Passed away	

2.3 Guardian (please answer this only if the child does not live with parents).

☐ Government officer/ State Enterprise	☐ Non-government officer
☐ Businessman	☐ Agricultural worker
☐ Labour worker	☐ House wife/does not work
☐ Other, please specify_____	☐ do not know
☐ Passed away	

3. What is the highest Educational Level of parents? (If you are either father or mother please answer only 3.1, 3.2, if you are not please answer all 3.1, 3.2 and 3.3)

3.1 Father

☐ Less than Primary level
☐ Primary level
☐ Junior high school level
☐ High school level
☐ Vocational Level
☐ Bachelor degree
☐ Above Bachelor degree
☐ other please specify.....

3.2 Mother

☐ Less than Primary level
☐ Primary level
☐ Junior high school level
☐ High school level
☐ Vocational Level
☐ Bachelor degree
☐ Above Bachelor degree
☐ other please specify.....

3.3 Guardian (please answer this only if the child does not live with parents).

☐ Less than Primary level
☐ Primary level
☐ Junior high school level
☐ High school level
☐ Vocational Level
☐ Bachelor degree
☐ Above Bachelor degree
☐ other please specify.....

4. What is the average income of your family per month?

☐ Less than 3,000 baht
☐ 3,001-6,000 baht
☐ 6,001-9,000 baht
☐ 9,001–12,000 baht
☐ 12,001–15,000 baht
☐ 15,001–18,000 baht
☐ Above 18,001 baht
☐ do not know

5. What is the system of payment for your child's dental care besides free school dental service?

☐ Public service employee cover for family members to go to public dental services at any time
☐ Private or State Enterprise scheme for family members to go to public or private services at any time
☐ Under children 0-15 years old scheme to go to public dental services only during working hours
☐ Out of the pocket
☐ Do not know

6. What is this child's parents' marital status?

☐ Married/living together
☐ Widow/divorced/separated
☐ Do not know

Part II

Now we would like to ask you about your child's <u>dental pain and dental discomfort</u>

Dental pain refers to when your child have pain because of a tooth problem. **Dental discomfort** refers to any problem with your child's teeth or mouth, for example, pain or discomfort after treatment, discomfort from eating cold or hot foods.

7. Has your child ever had dental pain or dental discomfort in his/her life time?
☐ Yes ☐ No

8. Has your child had dental pain or dental discomfort **today?**
☐ Yes ☐ No ☐ cannot remember

9. **In the past 7 days**, has your child ever had dental pain or dental discomfort and made your child missed school? (Please also specify the duration of symptom and duration of school time missed)
☐ Yes, my child had the problem for .....hours or .....days
And it made my child missed school for.....hours or .....days
☐ Yes, my child had the problem for .....hours or .....days
But it did not make my child missed school.
☐ No
☐ Cannot remember

10. **In the past 1 month**, h has your child ever had dental pain or dental discomfort and made your child missed school? (Please also specify the duration of symptom and duration of school time missed)
☐ Yes, my child had the problem for .....hours or .....days
And it made my child missed school for.....hours or .....days
☐ Yes, my child had the problem for .....hours or .....days
But it did not make my child missed school.
☐ No
☐ Cannot remember

11. **In the past 3 months** has your child ever had dental pain or dental discomfort and made your child missed school? (Please also specify the duration of symptom and duration of school time missed)
☐ Yes, my child had the problem for .....hours or .....days
And it made my child missed school for.....hours or .....days
☐ Yes, my child had the problem for .....hours or .....days
But it did not make my child missed school.
☐ No
☐ Cannot remember

12. **In the past 6 months** has your child ever had dental pain or dental discomfort and made your child missed school? (Please also specify the duration of symptom and duration of school time missed)

☐ Yes, my child had the problem for .....hours or .....days
And it made my child missed school for.....hours or .....days
☐ Yes, my child had the problem for .....hours or .....days
But it did not make my child missed school.
☐ No
☐ Cannot remember

Part III

In this part we would like to ask you about your child's dental care.

13. Has your child ever been to dentist in his/her whole life?
☐ Yes ☐ No

14. When did your child last have dental treatment?
☐ Never had dental check up or dental treatment ☐ Within 1 weeks
☐ Within 4 weeks ☐ Within 6 months
☐ Over 6 months ☐ Do not know/Cannot remember

15. Does your child's school have School Dental Service?
☐ Yes ☐ No

16. What type of dental care that you consent your child to receive from School Dental Service?
☐ Only dental screening ☐ Dental screening and dental treatment
☐ None of the service ☐ The school does not have School Dental Service

Next, we would like to ask about your child dental care in general

17. What type of dental clinics that your child most often goes to?
☐ Never had dental check up or dental treatment
☐ Private dental clinic
☐ Dental clinic at public hospital
☐ Dental clinic at private hospital
☐ School Dental clinics
☐ Health station
☐ Others, please specify_____

18. When does your child usually have dental care?
☐ During school time
☐ Not during school time
☐ Both during school time and not during school time.

19. **In the past 1 month**, has your child ever visited to any dental clinics that is not the school dental service?
☐ Yes ☐ No

20. **In the past 1 month**, has the dental visit(s) in question 19 ever made your child miss one or more school classes?
☐ Yes, and it made my child missed school for.....hours or .....days
☐ No
☐ Cannot remember
☐ My child hasn't had any dental visits during this time.

21. **In the past 1 month**, has your child ever had any bleeding problem after tooth extraction and ever made your child miss school?

☐ Yes, my child had the problem for .....hours or .....days
And it made my child missed school for.....hours or .....days
☐ Yes, my child had the problem for .....hours or .....days
But it did not make my child missed school.
☐ No
☐ Cannot remember

22. **In the past 1 month**, has your child ever had any oral ulcer and ever made your child miss school?

☐ Yes, my child had the problem for .....hours or .....days
And it made my child missed school for.....hours or .....days
☐ Yes, my child had the problem for .....hours or .....days
But it did not make my child missed school.
☐ No
☐ Cannot remember

Part IV

Now we would like to ask you about your child's school absence because of <u>other reasons</u> in the <u>past 1 month</u>.
If your child had missed school for any of reasons during the past 1 month please state the number of school hours or days missed.

23. **In the past 1 month** has your child <u>ever missed school</u> because your child was ill and went to see a doctor?
☐ Yes, and it made my child miss school for.....hours or .....days
☐ No
☐ Cannot remember

24. **In the past 1 month** has your child <u>ever missed school</u> because your child was ill and rested at home?
☐ Yes, and it made my child miss school for.....hours or .....days
☐ No
☐ Cannot remember

25. **In the past 1 month** has your child ever missed school because your child participated family's events, i.e. went to a wedding or funeral, helped parents do housework, looked after of sick family members, visiting relatives, went on a vacation?
☐ Yes, and it made my child miss school for……hours or ……days
☐ No
☐ Cannot remember

Part V

Now I would like to ask you about other pains that your child may experienced in the past 1 month.

26. **In the past 1 month** has your child ever missed school because your child had a headache?
☐ Yes, and it made my child miss school for……hours or ……days
☐ No
☐ Cannot remember

27. **In the past 1 month** has your child ever missed school because your child had a stomachache?
☐ Yes, and it made my child miss school for……hours or ……days
☐ No
☐ Cannot remember

28. **In the past 1 month** has your child ever missed school because your child had an earache?
☐ Yes, and it made my child miss school for……hours or ……days
☐ No
☐ Cannot remember

This is the end of the questionnaire ☺.
Thank you very much for answering our questionnaire!
Please check if you have answered it completely and ask the child to bring the questionnaire back to the teacher at school.

☼☺ ☺Best Wishes.☺ ☺☼

Appendix 5

Questionnaire for parent and guardian (English version)
แบบสอบถามสำหรับผู้ปกครองเกี่ยวกับการขาดเรียนของเด็กเนื่องจากปัญหาฟัน

คำชี้แจง เลขที่วิจัย.....

1. แบบสอบถามฉบับนี้จะถามข้อมูล <u>เด็กในปกครองของท่าน ซึ่งหมายถึงเด็กที่มีชื่อระบุในแบบสอบถาม</u>
2. กรุณาเขียนเครื่องหมาย √ลงในช่อง ⌈ ให้ตรงตามความเป็นจริงหรือเขียนคำตอบลงในช่องว่างที่กำหนดให้
3. แบบสอบถามฉบับนี้ใช้เวลาในการตอบประมาณ 20 นาที
4. **คำตอบของท่านจะไม่มีถูกหรือผิด เราจะเก็บคำตอบของท่านเป็นความลับและจะสรุปผลโดยภาพรวมมิใช่รายบุคคล ข้อมูลจากท่านจะเป็นประโยชน์ต่อการนำไปใช้ในการปรับระบบบริการทันตกรรมแก่เด็กนักเรียนต่อไป**
5. เมื่อทำแบบสอบถามเสร็จแล้วกรุณาให้เด็กในปกครองของท่านนำส่งคืนที่คุณครูประจำชั้น ขอบคุณค่ะ

ตอนที่ 1 **ข้อมูลทั่วไปของเด็กในปกครองของท่าน**

ชื่อ.. .....ชั้น ป 6/.....โรงเรียน.....

1. ความสัมพันธ์ของท่านกับเด็กในปกครองของท่าน

□บิดา

□มารดา

□ผู้ปกครอง(ที่มิใช่บิดา มารดา) โปรดระบุ.....

2. อาชีพของบิดา มารดา หรือ ผู้ปกครอง (ถ้าเด็กอาศัยอยู่กับ บิดาหรือมารดา ให้ตอบ ข้อ 2.1และ 2.2 เท่านั้น แต่ถ้าเด็กอาศัยกับผู้ปกครองที่มิใช่บิดา มารดา ให้ตอบทั้งข้อ 2.1 2.2 และ 2.3)

2.1 บิดา

□ข้าราชการ/พนักงาน ลูกจ้างประจำและชั่วคราวของส่วนราชการ และรัฐวิสาหกิจ

□พนักงาน/ลูกจ้างเอกชน

□ค้าขาย/ประกอบธุรกิจส่วนตัว

□เกษตรกร

□รับจ้างทั่วไป/กรรมกร

□ไม่ได้ประกอบอาชีพ

□อาชีพอื่นๆ โปรดระบุ.....

□ไม่ทราบ

□ถึงแก่กรรม

2.2 มารดา

□ข้าราชการ/พนักงาน ลูกจ้างประจำและชั่วคราวของส่วนราชการ และรัฐวิสาหกิจ

□พนักงาน/ลูกจ้างเอกชน

□ค้าขาย/ประกอบธุรกิจส่วนตัว

□เกษตรกร

□รับจ้างทั่วไป/กรรมกร

□ไม่ได้ประกอบอาชีพ

□อาชีพอื่นๆ โปรดระบุ.....

□ไม่ทราบ

□ถึงแก่กรรม

2.3 **ผู้ปกครองที่มิใช่บิดา มารดา** (ถ้าเด็กอาศัยอยู่กับบิดามารดา ท่านไม่ต้องตอบข้อ 2.3นี้)

□ข้าราชการ/พนักงาน ลูกจ้างประจำและชั่วคราวของส่วนราชการ และรัฐวิสาหกิจ □พนักงาน/ลูกจ้างเอกชน

□ค้าขาย/ประกอบธุรกิจส่วนตัว □เกษตรกร

□รับจ้างทั่วไป/กรรมกร □ไม่ได้ประกอบอาชีพ

□อาชีพอื่นๆ โปรดระบุ.....

3. ระดับการศึกษาสูงสุดของบิดา มารดา และผู้ปกครอง ((ถ้าเด็กอาศัยอยู่กับ บิดาหรือมารดา ให้ตอบ ข้อ 3.1และ 3.2 เท่านั้น แต่ถ้าเด็กอาศัยกับผู้ปกครองที่มิใช่บิดา มารดา ให้ตอบทั้งข้อ 3.1 3.2 และ 3.3)

3.1 **บิดา**

□ต่ำกว่าประถมศึกษา □ประถมศึกษา

□มัธยมศึกษาตอนต้น □มัธยมศึกษาตอนปลาย

□ปวช. ปวส. ปวท. อนุปริญญา □ปริญญาตรี

□สูงกว่าปริญญาตรี □อื่นๆ โปรดระบุ.....

□ไม่ทราบ

3.2 **มารดา**

□ต่ำกว่าประถมศึกษา □ประถมศึกษา

□มัธยมศึกษาตอนต้น □มัธยมศึกษาตอนปลาย

□ปวช. ปวส. ปวท. อนุปริญญา □ปริญญาตรี

□สูงกว่าปริญญาตรี □อื่นๆ โปรดระบุ.....

□ไม่ทราบ

3.3 **ผู้ปกครองที่มิใช่บิดา มารดา** (ถ้าเด็กอาศัยอยู่กับบิดามารดา ท่านไม่ต้องตอบข้อ 3.3นี้)

□ต่ำกว่าประถมศึกษา □ประถมศึกษา

□มัธยมศึกษาตอนต้น □มัธยมศึกษาตอนปลาย

□ปวช. ปวส. ปวท. อนุปริญญา □ปริญญาตรี

□สูงกว่าปริญญาตรี □อื่นๆ โปรดระบุ.....

□ไม่ทราบ

4. รายได้เฉลี่ยต่อเดือนของครอบครัวที่เลี้ยงดูเด็กในปกครองของท่านคนนี้รวมกัน เป็นเท่าใด

□น้อยกว่า 3,000บาท □3, 001 – 6,000 บาท

□6,001 -9,000บาท □9,001 - 12,000 บาท

□12,001 – 15,000 บาท □15,001 - 18,000 บาท

□18,001 บาทขึ้นไป □ไม่ทราบ

5. โดยทั่วไปท่านมี สวัสดิการค่ารักษาฟันหรือโรคในช่องปากของเด็กในปกครองของท่าน อย่างไร

□ บิดา/มารดา เบิกต้นสังกัดได้เฉพาะการรักษาในสถานบริการของรัฐ

□บิดา/มารดา เบิกต้นสังกัดได้ทั้งการรักษาในสถานบริการของรัฐและของเอกชน

□ เด็กในปกครองใช้สิทธิบัตรประกันสุขภาพ หรือ บัตรทอง

□บิดา/มารดา/ผู้ปกครอง จ่ายค่ารักษาด้วยตนเอง □ไม่ทราบ

6.สถานภาพสมรสของบิดามารดา ของเด็กในปกครองของท่าน

□สมรส /อยู่กินด้วยกัน

□หม้าย/หย่าร้าง/แยกทางกัน

□ไม่ทราบ

ตอนที่ 2 **คำถามเรื่องการปวดฟัน ปัญหาในช่องปากอื่นๆที่เด็กในปกครองของท่านเคยประสบ**

คำอธิบาย: **อาการปวดฟัน** หมายถึง อาการปวดเนื่องจากปัญหาฟัน ฟันผุจนปวด เหงือกบวมเป็นหนอง ฟันหัก/โยก จนปวด

อาการไม่สบายเนื่องจากฟันเป็นสาเหตุ หมายถึง อาการเสียวฟันเมื่อรับประทานอาหารร้อนหรือเย็น เคี้ยวอาหารไม่สะดวก อาการรู้สึกไม่สบายหลังทำฟัน เสียวฟันหลังทำฟัน

7. เด็กในปกครองของท่านเคย**ปวดฟันหรือมีอาการไม่สบายเนื่องจากฟันเป็นสาเหตุ** หรือไม่ตั้งแต่เกิดมา

□เคย □ไม่เคย

8. **ในวันนี้**เด็กในปกครองของท่าน**มีอาการปวดฟัน หรืออาการไม่สบายเนื่องจากฟันเป็นสาเหตุ**ใช่หรือไม่

□ใช่ □ไม่ใช่ □จำไม่ได้

9. **ใน 1 สัปดาห์ที่ผ่านมา (ตั้งแต่ 2547ถึง 2547)**เด็กในปกครองของท่านเคย**มีอาการปวดฟัน หรืออาการไม่สบายเนื่องจากฟันเป็นสาเหตุ และทำให้ขาดเรียน**ใช่หรือไม่ (โปรดระบุเวลาที่มีอาการและเวลาที่ทำให้ขาดเรียนด้วย)

□ใช่ มีอาการเป็นเวลา.....ชั่วโมง หรือ .....วัน.และทำให้ขาดเรียนเป็นเวลา .....ชั่วโมง หรือ .....วัน.

□ใช่ มีอาการเป็นเวลา.....ชั่วโมง หรือ .....วัน แต่ไม่ทำให้ขาดเรียน

□ไม่ใช่

□จำไม่ได้

10. **ใน 1 เดือนที่ผ่านมา (ตั้งแต่ 2547ถึง 2547)**เด็กในปกครองของท่านเคย**มีอาการปวดฟัน หรืออาการไม่สบายเนื่องจากฟันเป็นสาเหตุ และทำให้ขาดเรียน** ใช่หรือไม่(โปรดระบุเวลาที่มีอาการและเวลาที่ทำให้ขาดเรียนด้วย)

□ใช่ มีอาการเป็นเวลา.....ชั่วโมง หรือ .....วัน.และทำให้ขาดเรียนเป็นเวลา .....ชั่วโมง หรือ .....วัน.

□ใช่ มีอาการเป็นเวลา.....ชั่วโมง หรือ .....วัน แต่ไม่ทำให้ขาดเรียน

□ไม่ใช่

□จำไม่ได้

11. **ใน 3 เดือนที่ผ่านมา (ตั้งแต่ 2547ถึง 2547)**เด็กในปกครองของท่านเคย**มีอาการปวดฟัน หรืออาการไม่สบายเนื่องจากฟันเป็นสาเหตุ และทำให้ขาดเรียน** ใช่ หรือไม่(โปรดระบุเวลาที่มีอาการและเวลาที่ทำให้ขาดเรียนด้วย)

□ใช่ มีอาการเป็นเวลา.....ชั่วโมง หรือ .....วัน.และทำให้ขาดเรียนเป็นเวลา .....ชั่วโมง หรือ .....วัน.

□ใช่ มีอาการเป็นเวลา.....ชั่วโมง หรือ .....วัน แต่ไม่ทำให้ขาดเรียน

□ไม่ใช่

□จำไม่ได้

12. **<u>ใน 6 เดือนที่ผ่านมา(ตั้งแต่ 2547ถึง 2547)</u>เด็กในปกครองของท่านเคยมีอาการปวดฟัน หรืออาการไม่สบายเนื่องจากฟันเป็นสาเหตุ และทำให้ขาดเรียน** ใช่ หรือไม่(โปรดระบุเวลาที่มีอาการและเวลาที่ทำให้ขาดเรียนด้วย)

□ใช่ มีอาการเป็นเวลา.....ชั่วโมง หรือ .....วัน.และทำให้ขาดเรียนเป็นเวลา .....ชั่วโมง หรือ .....วัน.

□ใช่ มีอาการเป็นเวลา.....ชั่วโมง หรือ .....วัน แต่ไม่ทำให้ขาดเรียน

□ไม่ใช่

□จำไม่ได้

ตอนที่ 3 **คำถามเกี่ยวกับการดูแลทันตสุขภาพของนักเรียน**

คำอธิบาย: การทำฟันหมายถึง การรับการดูแลรักษาสุขภาพช่องปาก ได้แก่ การอุดฟัน ถอนฟัน ขูดหินปูน ขัดฟัน เคลือบหลุมร่องฟัน เคลือบฟลูออไรด์ รักษารากฟัน ใส่ครอบฟัน จัดฟัน

13. ตั้งแต่เกิดมาเด็กในปกครองของท่านเคยได้รับการตรวจฟัน หรือ ทำฟัน หรือไม่

□ เคย □ไม่เคย

14. เด็กในปกครองของท่านไปตรวจฟัน หรือ ทำฟันครั้งสุดท้ายเมื่อใด

□ไม่เคยตรวจฟันหรือทำฟันเลย □ภายใน 1 สัปดาห์ที่ผ่านมา

□ ภายใน 1 เดือนที่ผ่านมา □ ภายใน 6 เดือนที่ผ่านมา

□ ผ่านมาเกิน 6 เดือน □จำไม่ได้

15. โรงเรียนของเด็กในปกครองของท่านมี **โครงการทันตกรรมโรงเรียน *(หมายถึง มีหมอฟันมาให้บริการตรวจฟัน หรือ ตรวจและ ทำฟันนักเรียนที่โรงเรียน หรือรับ / นัดนักเรียนไปทำฟันที่สถานบริการ)*** หรือไม่

□มี □ไม่มี

16. ท่านอนุญาตให้เด็กในปกครองของท่านรับบริการทำฟันใดบ้างจาก**โครงการทันตกรรมโรงเรียน**

□ตรวจฟันเท่านั้น □ทั้งตรวจและรักษา

□ไม่อนุญาตให้รับบริการใดๆกับโครงการทันตกรรมของโรงเรียน □โรงเรียนไม่มีบริการทันตกรรม

ต่อไปเป็นคำถามเกี่ยวกับการทำฟันทั่วๆไป

17. โปรดระบุประเภทของคลินิกทำฟันที่เด็กในปกครองของท่านไปใช้บริการ<u>บ่อยที่สุด</u> เพียง1ประเภท

□เด็กไม่เคยได้รับการตรวจฟันหรือทำฟันเลย □คลินิกทำฟันเอกชน

□โรงพยาบาลของรัฐ □โรงพยาบาลเอกชน

□คลินิกโครงการทันตกรรมของโรงเรียน □สถานีอนามัย

□อื่นๆ โปรดระบุ.....

18. ส่วนใหญ่เด็กในปกครองของท่านไปทำฟันในช่วงเวลาใด

□ไม่เคยตรวจฟันหรือทำฟันเลย □ในเวลาเรียน

□นอกเวลาเรียน □ทั้งในเวลาเรียน และนอกเวลาเรียน

19. **<u>ใน1 เดือนที่ผ่านมา(ตั้งแต่ 2547ถึง 2547)</u>**เด็กในปกครองของท่านเคยไปคลินิกทำฟันที่ไม่ใช่คลินิกของโรงเรียนหรือไม่

□เคย □ไม่เคย

20. **<u>ใน1 เดือนที่ผ่านมา</u>** การไปคลินิกทำฟันในข้อ 19 ทำให้เด็กในปกครองของท่านขาดเรียนหรือไม่

□ใช่ และทำให้ขาดเรียนเป็นเวลา.....ชั่วโมง หรือ .....วัน.

□ไม่ใช่

□จำไม่ได้

□ไม่เคยไปทำฟันในช่วงนี้

21.**<u>ใน1 เดือนที่ผ่านมา</u>** เด็กในปกครองของท่านเคย **มีเลือดออกผิดปกติภายหลังการถอนฟัน** และ**ทำให้ขาดเรียน**ใช่หรือไม่

□ใช่ มีอาการและทำให้ขาดเรียนเป็นเวลา .....ชั่วโมง หรือ .....วัน.

□ใช่ มีอาการแต่ไม่ทำให้ขาดเรียน

□ไม่ใช่

□จำไม่ได้

22. **<u>ใน1 เดือนที่ผ่านมา</u>** เด็กในปกครองของท่านเคย**ปวดแผลร้อนในหรือ แผลในปาก**และ**ทำให้ขาดเรียน**ใช่หรือไม่

□ใช่ มีอาการและทำให้ขาดเรียนเป็นเวลา .....ชั่วโมง หรือ .....วัน.

□ใช่ มีอาการแต่ไม่ทำให้ขาดเรียน

□ไม่ใช่

□จำไม่ได้

ตอนที่ 4	**คำถามเกี่ยวกับการขาดเรียนเนื่องจาก<u>ปัญหาอื่นๆ</u> ใน 1 เดือนที่ผ่านมา (<u>ตั้งแต่ 2547ถึง 2547</u>)**

23..**<u>ใน1 เดือนที่ผ่านมา</u>** เด็กในปกครองของ ท่าน**<u>เคยขาดเรียน</u>**เนื่องจากเด็กในปกครองของท่าน **ป่วยและต้องไปพบแพทย์**ใช่ หรือไม่

□ใช่ และทำให้ขาดเรียนเป็นเวลา.....ชั่วโมง หรือ .....วัน.

□ไม่ใช่

□จำไม่ได้

24..**<u>ใน1 เดือนที่ผ่านมา</u>** เด็กในปกครองของท่าน**<u>เคยขาดเรียน</u>**เนื่องจากเด็กในปกครองของท่าน**ป่วยและนอนพักอยู่ที่บ้าน(ไม่ต้องไปหาแพทย์)**ใช่หรือไม่

□ใช่ และทำให้ขาดเรียนเป็นเวลา.....ชั่วโมง หรือ .....วัน.

□ไม่ใช่

□จำไม่ได้

25. <u>ใน1 เดือนที่ผ่านมา</u> เด็กในปกครองของท่าน<u>เคยขาดเรียน</u>เนื่องจาก **การร่วมกิจกรรมของครอบครัว เช่น ไปงานแต่งงาน งานศพ งานบวช ช่วยผู้ปกครองทำงาน ดูแลสมาชิกครอบครัวที่ป่วย ไปเยี่ยมญาติ ไปพักผ่อนตากอากาศ ฯลฯ** ใช่ หรือไม่

□ใช่ และทำให้ขาดเรียนเป็นเวลา.....ชั่วโมง หรือ .....วัน.

□ไม่ใช่

□จำไม่ได้

ตอนที่ 5 **คำถามเกี่ยวกับ<u>อาการปวดอื่นๆที่เด็กในปกครองของท่านเคยมี ในระยะเวลา 1 เดือนที่ผ่านมา ตั้งแต่ 2547 ถึง 2547)</u>**

26. **ใน1 เดือนที่ผ่านมา** เด็กในปกครองของท่าน<u>เคยขาดเรียน</u>เนื่องจาก**ปวดศีรษะ** ใช่หรือไม่

□ใช่ และทำให้ขาดเรียนเป็นเวลา.....ชั่วโมง หรือ .....วัน.

□ไม่ใช่

□จำไม่ได้

27. **ใน1 เดือนที่ผ่านมา** เด็กในปกครองของท่าน<u>เคยขาดเรียน</u>เนื่องจาก**ปวดท้อง**ใช่หรือไม่

□ใช่ และทำให้ขาดเรียนเป็นเวลา.....ชั่วโมง หรือ .....วัน.

□ไม่ใช่

□จำไม่ได้

28. **ใน1 เดือนที่ผ่านมา** เด็กในปกครองของท่าน<u>เคยขาดเรียน</u>เนื่องจาก**ปวดหู**ใช่หรือไม่

□ใช่ และทำให้ขาดเรียนเป็นเวลา.....ชั่วโมง หรือ .....วัน.

□ไม่ใช่

□จำไม่ได้

แบบสอบถามสิ้นสุดเพียงเท่านี้ค่ะ โปรดตรวจสอบอีกครั้งว่าได้ตอบคำถามครบถ้วน เมื่อเสร็จแล้วกรุณาให้นักเรียนนำส่งคืนที่คุณครูประจำชั้น ขอบคุณท่านมากที่ให้ความร่วมมือในการตอบแบบสอบถาม

☼☺☺☼

Appendix 6

School Dental Service Observation Form (English version)

Research number ..... Recorder code .....

Subject name .....Class Level.....
School name.....
Birthday (D/M/Y).....
Name of Hospital / clinic.....
Sex: OMale OFemale

School hours per days.....
Start Time.....break.....Lunch.....break.....Finish.....

Dental screening Day (D/M/Y_____)

By ODental nurse ODentist Oothers

Time leave Classroom.....Time arrive screening area.....
Time spent for traveling.....hours.....minutes.....seconds

Time begins dental screening_____Time finished screening.....
Screening time.....hours.....minutes.....seconds

If the child received dental treatment on dental screening day (Go to next page)

Time leave screening area.....Time arrive classroom.....
Time for traveling back.....hours.....minutes.....seconds

Summary

Dental screening time.....hours.....minutes.....seconds
Traveling time.....hours.....minutes.....seconds
Waiting time.....hours.....minutes.....seconds
Total school absence time.....hours.....minutes.....seconds

Treatment Day (D/M/Y)_____

Place of Treatment:
OSchool OHospital OHealth Station

Time leave school / classroom_____
Time arrive at clinic_____
Time of traveling.....hours.....minutes.....seconds

Time for dental treatment and dental care
OOHI or □any education
from.....to..... =.....hours.....minutes.....seconds
O Scaling
from.....to.....=.....hours.....minutes.....seconds

O Restoration.....teeth..... sides (identify numbers of teeth / sides)
from.....to..... =.....hours.....minutes.....seconds

OSealant.....sextants
from.....to..... =.....hours.....minutes.....seconds

O Extraction.....teeth
from.....to..... =.....hours.....minutes.....seconds

OR have local anesthetic injection
from.....to.....=.....hours.....minutes.....seconds
And come back for extraction
from.....to..... =.....hours.....minutes.....seconds

Time finish dental care.....
Time leave clinic.....
(Waiting for going back.....hours.....minutes.....seconds)
Time arrive classroom.....
(Traveling time.....hours.....minutes.....seconds}

Does the child required more dental treatment
OYes ONo
If yes, with O SDS for .....times
OPrivate appointment

Summary
Dental care time.....hours.....minutes.....seconds
Traveling time.....hours.....minutes.....seconds
Waiting time .....hours.....minutes.....seconds
Total school absence time.....hours.....minutes.....seconds

Appendix 6

School Dental Service Observation Form (Thai version)

แบบประเมินงานบริการทันตกรรมของงานเฝ้าระวังและส่งเสริมทันตสุขภาพนักเรียนประถมศึกษา

เลขที่วิจัยของอาสาสมัคร.....รหัสผู้สำรวจ.....

โรงเรียน.....ชั้น.....เลขที่ในชั้น.....

ชื่อนักเรียน.....Oชาย Oหญิง

วันเกิด(วัน/เดือน/ปี) .....25.....(อายุ ณ วันที่ตรวจฟัน.....ปี.....เดือน.....วัน)

จำนวนชั่วโมงเรียน ต่อ วัน: .....

(เวลาเริ่มเรียน.....พักเช้า.....พักรับประทานอาหาร.....พักบ่าย.....เลิกเรียน.....)

วันตรวจฟัน (วัน/เดือน/ปี) 2547

หน่วยงานที่ให้บริการ.....

จำนวนผู้ตรวจฟันที่ให้บริการวันนี้.....

จำนวนนักเรียนที่ให้บริการวันนี้.....

ประเภทของผู้ตรวจ: Oทันตาภิบาล Oทันตแพทย์ Oอื่นๆ

เวลาออกจากห้องเรียน.....น..เวลาถึงบริเวณสถานที่รับบริการ.....น.

{ใช้เวลาเดินทางมา.....ชั่วโมง..... นาที.....วินาที}

เวลาที่เริ่มได้รับบริการ.....น.

O ตรวจฟัน ใช้เวลา.....นาที

O ทันตสุขศึกษา ใช้เวลา.....นาที

O ได้รับการรักษาทางทันตกรรมด้วยในวันที่มีการตรวจฟัน (ถ้ามี ให้ไปลงข้อมูลหน้า2 ได้เลย)

เวลาบริการเสร็จ.....น. เวลากลับห้องเรียน.....น..

{ใช้เวลาเดินทางกลับ.....ชั่วโมง..... นาที.....วินาที}

สรุป: เวลาเดินทาง.....ชั่วโมง..... นาที.....วินาที

เวลารับบริการ.....ชั่วโมง..... นาที.....วินาที

เวลารอคอย.....ชั่วโมง..... นาที.....วินาที

วันรับการรักษาทันตกรรม (วัน/เดือน/ปี) 2547

สถานที่รับบริการ: ○ โรงเรียน ○โรงพยาบาล ○สถานีอนามัย ○ อื่นๆ

หน่วยงานที่ให้บริการ.....

จำนวนทันตแพทย์/ทันตาภิบาล ที่ให้บริการวันนี้.....คน

จำนวนนักเรียนที่ได้รับบริการวันนี้.....คน

ประเภทของผู้ให้บริการ: ○ทันตาภิบาล ○ทันตแพทย์ ○อื่นๆ

เวลาออกจากห้องเรียน/ โรงเรียน.....เวลาถึงบริเวณสถานที่รับบริการ.....

{ใช้เวลาเดินทางมา.....ชั่วโมง..... นาที.....วินาที}

เวลาที่เริ่มได้รับบริการ.....น. เวลารอคอยก่อนได้รับบริการ.....ชั่วโมง..... นาที.....วินาที.

เวลาที่ใช้ในการรับบริการ

○ทันตสุขศึกษา หรือ □การศึกษาอื่นๆตั้งแต่.....น.ถึง.....น. เป็นเวลา.....นาที.....วินาที

○ ขูดหินน้ำลาย ตั้งแต่.....น.ถึง.....น. เป็นเวลา.....นาที.....วินาที

○ อุดฟัน จำนวน.....ซี่.....ด้าน ตั้งแต่.....น.ถึง.....น. เป็นเวลา.....นาที.....วินาที

○เคลือบหลุมร่องฟันจำนวน.....ซี่ ตั้งแต่.....น.ถึง..... น. เป็นเวลา.....นาที.....วินาที

○ ถอนฟัน.....ซี่ ตั้งแต่.....น.ถึง.....น. เป็นเวลา.....นาที.....วินาที

หรือ (เวลาที่ได้รับการฉีดยาชาตั้งแต่.....น.ถึง.....น. เวลาที่กลับมาถอนฟันตั้งแต่.....น.ถึง.....น.)

เวลาบริการเสร็จ.....น. เวลาออกจากสถานบริการ.....น.

(เวลาที่รอรถมารับกลับ) .....ชั่วโมง..... นาที.....วินาที.

เวลากลับถึงห้องเรียน/โรงเรียน.....น.{ใช้เวลาในการเดินทางกลับ.....ชั่วโมง.....นาที..... วินาที}

นักเรียนต้องได้รับการรักษาทันตกรรมอีกใช่หรือไม่

○ใช่ ○ ไม่ใช่

ถ้าใช่ ○ นัดกับทันตกรรมโรงเรียนครั้งต่อไป อีก.....ครั้ง

○ ผู้ปกครองต้องพาไปรักษาต่อเอง

ส่วนนี้สำหรับผู้วิจัยเท่านั้น

สรุป

เวลาที่ใช้ในการรับการรักษาทั้งหมด.....ชั่วโมง..... นาที.....วินาที

เวลารอคอยทั้งหมด.....ชั่วโมง..... นาที.....วินาที

เวลาเดินทางทั้งหมด.....ชั่วโมง..... นาที.....วินาที

Appendix 7

Materials and supplies used in the study

Instruments for clinical data collection

- Plane mouth mirrors
- Periodontal probes which conform to WHO specifications
- Disposable wooden Tongue spatula
- Cotton Pliers
- Gauze
- Paper towels
- Disposable masks
- Disposable gloves
- Face shields
- Headlamps
- Sterilising Solution and Containers
- Stationery; hardboard bases and clips, sharpened pencils, erasers, recording instructions, coding and criteria sheets
- Oral examination forms

Instrument for non-clinical data collection

- Attendance forms for assessing prevalence and reasons of school absence
- Self- completed Questionnaires for school children
- Self- completed Questionnaires for parents
- School Dental Service observation forms

Appendix 8

Ethical Approval from the Ethical Review Committee for Research in Human Subjects, Ministry of Public Health, Thailand

Document No. 29 ../2004

The Ethical Review Committee for Research in Human Subjects
Ministry of Public Health, Thailand

Title of Project : Impacts of Dental Care on School Absence (Ref. No.115/2546)

Principle Investigator . Miss. Bussayasit Pongpichit

Place of Proposed Study .

We also confirm that we are an ethics committee constituted in agreement and in accordance with the ICH-GCP.

Approved by The Ethical Review Committee for Research in Human Subjects Ministry of Public Health, Thailand.

Date of Approval 14 July 2004 .....Date of expire 31 January 2005 .....

Appendix 9

Ethical Approval from the Human Experimentation Committee, Faculty of Dentistry, Chiang Mai University, Chiang Mai, Thailand

NO. ....7 / 2004....

CERTIFICATE OF ETHICAL CLEARANCE

Human Experimentation Committee
Faculty of dentistry
Chiang Mai University
Chiang Mai, Thailand

Title of project or study : **Impacts of Dental Care on School Absence**

Principal Investigator : **Miss. Bussayasit Pongpichit**

Participating Institution (S) :

Approved by the Faculty of Dentistry Human Experimentation Committee : June 30, 2004

Signature of the Chairman of the Committee :

Countersigned :