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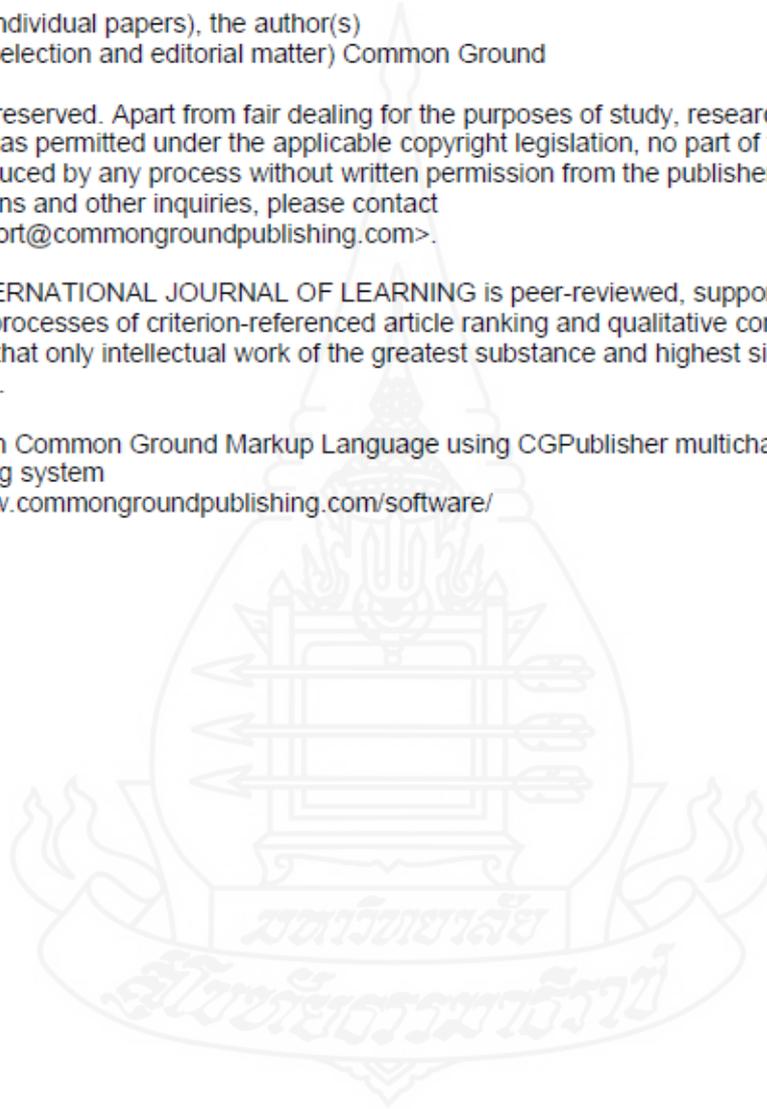
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Development of a Model for Administration of Student Dental Health Promotion Work for Basic Education Schools in Thailand

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Abstract: The purposes of this research were to develop and verify a model for administration of student dental health promotion work for basic education schools in Thailand. This research employed both the qualitative and quantitative research methodologies. The former methodology was employed in the model development stage; while the latter methodology was employed in the model verification stage. Key informants for the qualitative study were 53 specialists. The research sample for the quantitative study consisted of 72 basic education schools in Thailand classified into 36 schools with best practice in student dental health promotion administration and 36 basic education schools with ordinary practice in the counterpart administration. Informants from the schools totaling 726 randomly selected persons consisted of 72 school principals, 72 health care teachers and 582 classroom teachers. The data collecting methods for the qualitative study were the in-depth interview of 53 specialists and focus group discussion involving specialists; while that for the quantitative study was the use of a rating scale questionnaire, with reliability coefficient of .966, to collect data from the research sample. Qualitative data were analyzed with content analysis; while quantitative data were statistically analyzed using the frequency, percentage, mean, standard deviation, t-test, and confirmatory factor analysis. Research findings were as follows: (1) The developed model for administration of dental health promotion work in basic education schools consisted of five components: (a) policy formation and administration, (b) creation of school environment conducive to dental health promotion, (c) provision of knowledge on dental health education, (d) provision of services for dental health promotion, and (5) creation of relationships among the school, parents, and the community. (2) Verification of the developed model by using it to evaluate and compare the administration practice of student dental health promotion work in basic education schools with the best practice with that of other basic education schools in general revealed that the developed model was valid and feasible, as it could show that the dental health promotion administration work in the best practice schools was practiced at the significantly higher level than that in basic education schools in general at the .01 level. Also, the results of factor analysis of the data confirmed the validity of the model. The main recommendation was that the developed model should be adopted in basic education schools in Thailand in order to enhance the effectiveness and efficiency of the student dental health promotion work in school.

Keywords: Model Development, Student Dental Health Promotion Administration, Basic Education School, Thailand

Introduction

THE IMPORTANCE OF dental health promotion for children in basic education (primary and secondary) schools cannot be denied. It is at this age interval that milk teeth are gradually being replaced by permanent teeth and that dental health habits are being formed. Proper dental health care at this age interval will result in sound dental health in adult life; otherwise, dental health problems will persist throughout the person's life.

The World Health Organization (WHO) recognizes the importance of public health promotion. In 1986 it issued the Ottawa Charter declaring that public health promotion consists of building health public policy, creating supportive environments, strengthening community action, developing personal skills, and reorienting health service (WHO, 1986).

In spite of WHO's emphasis, public health problems still exist in most part of the world. In the area of dental health, problems with existing dental health care approach are 1) limited financial and material resources in both developed and developing countries 2) the goal of the system is providing treatment rather than encouraging oral health 3) determinants of health are narrowly defined with little emphasis on social and environments factors and 4) distance between dental professionals and people who often need care the most. (Pine and Harris, 2007: 20).

Thailand, a developing country, faces dental health problems commonly found in most developing countries. The prevalent dental health problem for primary school students is dental caries. Moreover, only 54.2 percent of students in primary school are without gingivitis, only 42 percent of them are tooth decay-free, and the average number of tooth decay, tooth filling and tooth extraction is 1.95 teeth per person in school-aged children. On the other hand, data on oral health promotion activities and management in schools show that 27.35 percent of children drink soft drinks like cola every day in school, 22.46 percent of them drink sweet beverage every day in school, and 63.53 percent of them eat crunchy snacks regularly. Meanwhile, the percentage of schools with oral health check by teachers twice a year is 93.35 percent; that of schools which have after lunch teeth-brushing activities is 95.45 percent; that of schools which do not sell snacks / drinks that can cause dental caries is only 45.52 percent; and that of schools which provide instruction on dental health based on the curriculum is 86.10 percent (Dental Health Division, Ministry of Health, 2007). The cited above data reflects the unsatisfactory conditions of dental health and dental health promotion administration in Thai basic education schools.

Based on the above information on the unsatisfactory conditions of dental health among school-aged Thai children, and the wide disparity of dental health promotion administration practices in Thai basic education schools, the researcher realized the needs to develop a relevant and feasible model for administration of student dental health promotion work for Thai basic education schools. So, the researcher decided to undertake this research study.

Objectives of the Study

This study was conducted with two following objectives:

1. To develop a model for administration of student dental health promotion work for Thai basic education schools.
2. To verify the validity of the developed mode for administration of student dental health promotion work.

Literature Review

Results of the review of related literature reveal several models of health promotion and health care administration in school, some of which are presented as follows:

The Health Promotion Model presented by the Ottawa Charter of WHO consists of building public health policy, creating supportive environments, strengthening community action, developing personal skills, and re-orienting health service. (WHO, 1986)

The National Primary Education Commission of Thailand presents the Model for Health Care Administration in School which consists of creating school health environment, providing health services, and creating school and home relationship. (National Primary Education Commission, 1997)

AASA (American Association of School Administration or AASA, 1955, 1971) presents the model for administration/management process and functions consists of planning, allocating of the resource, stimulating, coordinating and evaluation

Another model, derived from many sources, is the Health Promoting School Model which consists of school policies, school management practices, school/community projects, healthy school environment, school health services, school health education, nutrition and food safety, physical exercise/sport/recreation, counseling/social support, and health promotion for staff. (WHO, 2003; Pan American Health Organization, 2003; and Ministry of Public Health, Thailand, 2004; 2007)

These models contribute the health promotion concepts that were employed by the researcher to formulate his own conceptual framework for development of the model for administration of student dental health promotion work for basic education schools in Thailand.

Prior Research

There have been many previous research studies concerning student dental health condition, dental health education, and dental health promotion in school in various countries as well as in Thailand. Due to space limitation, only a few of these research studies are cited here.

Research Studies in Other Countries

Research studies in other countries concerning student dental health and dental health promotion in school are so numerous that it is impossible to present all of them and from all countries. So only those conducted in some countries are cited just to give a glimpse of the general picture. They are presented in the alphabetical order of the country names as follows:

In Albania, Bogdani (2003) studied the strategies for dental health protection and care of students. The study concluded that the new strategy for prevention of dental health problem comprised the use of fluoride-mixed dental paste, the provision of knowledge on dental health studies, the provision of supporting services, and the annual dental health check up.

In Brazil, Moyses and others (2003) studied the relationships between the policy for promotion of dental health in school and dental health condition indicators. The study found that the mother's educational level and family income had no significant correlation with tooth decay condition and tooth accident in the students. Students in schools in the Health Promotion Project schools had significantly better dental health than that of students in other schools.

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In Canada, Harrison (2003) studied dental health promotion work for children in the tooth decay risky group in British Columbia. Conclusions from the study were that the socio-economic status, family stress, and pattern of child rearing of parents played important roles affecting the occurring of tooth decay in children; therefore, co-operation from the parents and the community was vital for effective solution of the problem.

In India, Goel and others (2005) evaluated the effectiveness of a program on dental health promotion in school. They compared dental health conditions of students from different socio-economic status families. The study found significant difference in dental health conditions of students from families with different socio-economic statuses. Although students exhibited better dental health care behaviors, teaching dental health by lecturing alone might not be effective enough for long term development of student's dental health habits.

In Jordan, Rajab and others studied dental health behaviors of students in school and attitudes of parents toward dental health of their children. The study concluded that the dental health promotion program should be implemented in schools

In the United Kingdom, Sheiham (1992) studied the roles of dental service teams for promotion of dental health. Conclusions from the study were that there should be public policies for health promotion, the creation of environmental health conducive to health promotion, development of personal health skills, enhancement of community strength in the practice and provision of health services; and that the dental service teams should work in the integrative style with the provision of knowledge on health in general, promotion of community participation, and process-based administration with planning and determination of strategies that involve all stakeholders. Sheiham and Watt (2000) studied factors affecting dental health promotion. The study concluded that the dental health promotion program put emphasis on changing health behaviors of individuals regardless of the influence of social policy. Most problems on dental health were caused by food consumption habits, individual health condition, smoking, taking alcoholic drinks, stress, and injuries. Therefore, development of policies on food consumption control and on health promotion schools would be the effective approach for promotion of dental health. Kwan and others (2005) studied the promotion of dental health in health promotion schools. The study concluded that school personnel, parents, and the community involving in promotion of dental health exerted influences on living behaviors of children through development of attitudes and skills. Bad health conditions in children affected their life quality including their learning and success in the future.

In the United States, Blumenshine and others (2008) studied the effects of general health and dental health conditions of students on their learning in school. The study concluded that students with bad dental health conditions tended to have bad learning achievement. Therefore, improvement of students' dental health would lead to improvement of their learning achievement. Vinciullo (2006) studied the relationship between the program of the health promotion school and learning achievement of students. The study concluded that every component of the health promotion school had positive relationship with learning achievement of students. The achievement scores of students in learning promotion schools were significantly higher than those of students in schools without health promotion programs.

Research Studies in Thailand

Research studies in Thailand directly related to this study are those on administration of school health program in health promotion schools and dental health promotion schools.

Only a few selected studies are cited here as follows: Thanya Komutwong (1998) studied the effectiveness of health promotion school to promote personal health behaviors of Grades 5 and 6 students in Pathum Thani province. The study concluded that the components of administration of the effective health promotion school were the formulation and implementation of policy on personal health practice, the provision of environment conducive to personal health practice, the establishment of buddy groups for encouragement on personal health practice, the development of learning plans on personal health practice, the parents receiving information on personal health of students, and the collaboration of public health officials in the personal health promotion program of the school. Aree Danpradith (2003) studied factors that promoted and inhibited the development of health promotion school. Conclusions from the study were that factors that promoted the development of health promotion school were (1) leadership and enthusiasm of the school administrator; (2) the sense of belonging and team working of the school personnel; (3) the participation of the community, parents, and students; and (4) the supports and advices from public health personnel; while factors that inhibited the development of health promotion school were (1) the school administrator's initial lack of knowledge on the operation of the health promotion school; (2) the initial unwillingness to participate in the project of some school personnel; and (3) the insufficient financial support provided by local politicians at the beginning of the project. Worawan Assawakul and others (1993) studied the operation of dental health promotion work in primary schools selected as the outstanding practice schools and in ordinary primary schools. The study concluded that the following conditions existed in the outstanding practice primary schools; (1) the school administrator had knowledge and understanding on dental health promotion in school; (2) the school administrator realized the importance of and gave full supports to dental health promotion in school; (3) the students were equipped with good knowledge of dental health, knew their own oral health problems, and receive dental health services; and (4) the co-operation of teachers in the school. Also, from the observation, it was found that the outstanding practice schools organized more dental health promotion activities than the ordinary schools did. Phokham Nakkham and others (2003) studied the effectiveness of and factors affecting the effectiveness of watch and care for and promotion of dental health practice in primary schools. The study concluded that effectiveness of the majority of schools in the operation of watch and care for and promotion of dental health practice was at the rather high level. Three groups of factors were found to affect the operation effectiveness: the school factors, the family factors, and the student factors. The school factors comprised the following: formulation of policy and planning; appointment of teacher working teams; budgets and supporting facilities; monitoring and evaluation; behaviors and satisfaction of teachers; and characteristics of provided activities. The family factors comprised the following: behaviors and beliefs in the family concerning dental health; the access to information on public dental health of the community; and the collaboration among the school, parents, and public health work units. The student factors comprised the following: students' knowledge and understanding on what to do concerning dental health; students' dental health behaviors at home and in school; and satisfaction of students with the operation of the dental health promotion program.

Research Methodology

This study is a research and development study. It was conducted in two stages: the model development stage, and the model verification stage. Details of activities in each stage are briefly presented as follows:

Model Development Stage

The objective of this stage is to develop a model for administration of student dental health promotion work for Thai basic education schools. The qualitative research methodology was employed in this stage. Research activities in this stage are the following:

1. The researcher developed the first draft of the conceptual framework of the model for administration of student dental health promotion work in school based on results of literature review and prior research studies.
2. The researcher conducted in-depth interviews to obtain opinions and seek specialist advices concerning the first draft of the model of 53 purposively selected specialists on student dental health promotion in school comprising 5 school administrators; 5 school health teachers; 5 classroom teachers; 5 parents; 5 directors of the Offices of Educational Service Area; 5 educational supervisors; 5 dentists; 5 dental health care officials; 5 representatives of local administration organizations; 2 lecturers from a Faculty of Dentistry; 1 lecturer from a Faculty of Nursing; 1 director of the Bureau of Public Dental Health; 1 specialist on policy and plan analysis of the Ministry of Education; 1 specialist from the Bureau of Health Promotion, Ministry of Public Health; 1 specialist from the Bureau of Public Dental Health; and 1 ex-head of the Division of Hygiene, Ministry of Education. Information obtained from the interviews was analyzed by content analysis. Then the researcher revised the conceptual framework model based on the information obtained from in-depth interviews.
3. After that, the researcher conducted a focus group discussion involving 16 specialists purposively selected from the above-mentioned list to seek their consensus opinions on the revised draft of the model. Their consensus opinions were used to develop the final draft of the model.

Model Verification Stage

The objective of this stage is to verify the validity of the developed model. The quantitative research methodology was employed in this stage. Two methods of validity verification were employed: the known-groups method and confirmatory factor analysis. Details of research activities are as follows:

1. For the known-groups validity verification method, the researcher started with identification of the 36 best practice schools on dental health promotion administration in the existing list of the Ministry of Public Health. This group was labeled the best practice schools group. Then he purposively selected 36 schools of comparable sizes and locations, with ordinary practice on dental health promotion administration, to be the match group. This group was labeled the general schools group. These two groups

of schools served as the sample for the known-groups method of validity verification of the model.

After identification of the research sample, the researcher developed a rating scale questionnaire based on the contents of the model components and activities. After try-out and subsequent improvement, the questionnaire was found to have a high level of validity and reliability coefficient of 0.966. This questionnaire then was employed to collect data for comparison of administration practices in the best practice schools with the counterpart practices in the general schools. Questionnaire respondents totaling 726 school personnel consisted of 374 school administrators, school health teachers, and classroom teachers from the 36 best practice schools and 352 counterpart school personnel from 36 general schools. Statistics employed for data analysis included the rating mean, standard deviation, and t-test. If the rating means for the best practice schools are significantly higher than the counterpart rating means in the general schools, then the model has the validity because it can discriminate the best practice schools from other schools in general.

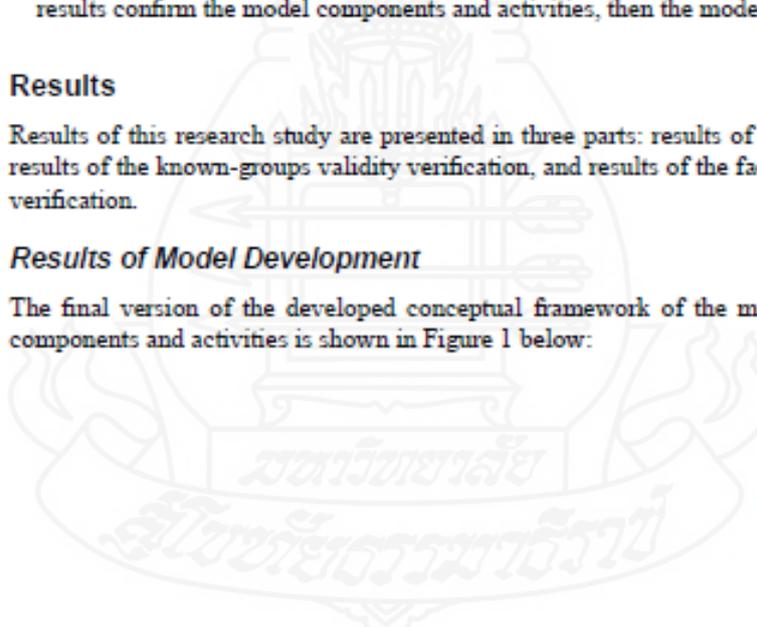
2. For the factor analysis verification method, research data obtained from the two groups of schools were analyzed with confirmatory factor analysis. If the factor analysis results confirm the model components and activities, then the model has validity.

Results

Results of this research study are presented in three parts: results of model development, results of the known-groups validity verification, and results of the factor analysis validity verification.

Results of Model Development

The final version of the developed conceptual framework of the model inclusive of its components and activities is shown in Figure 1 below:



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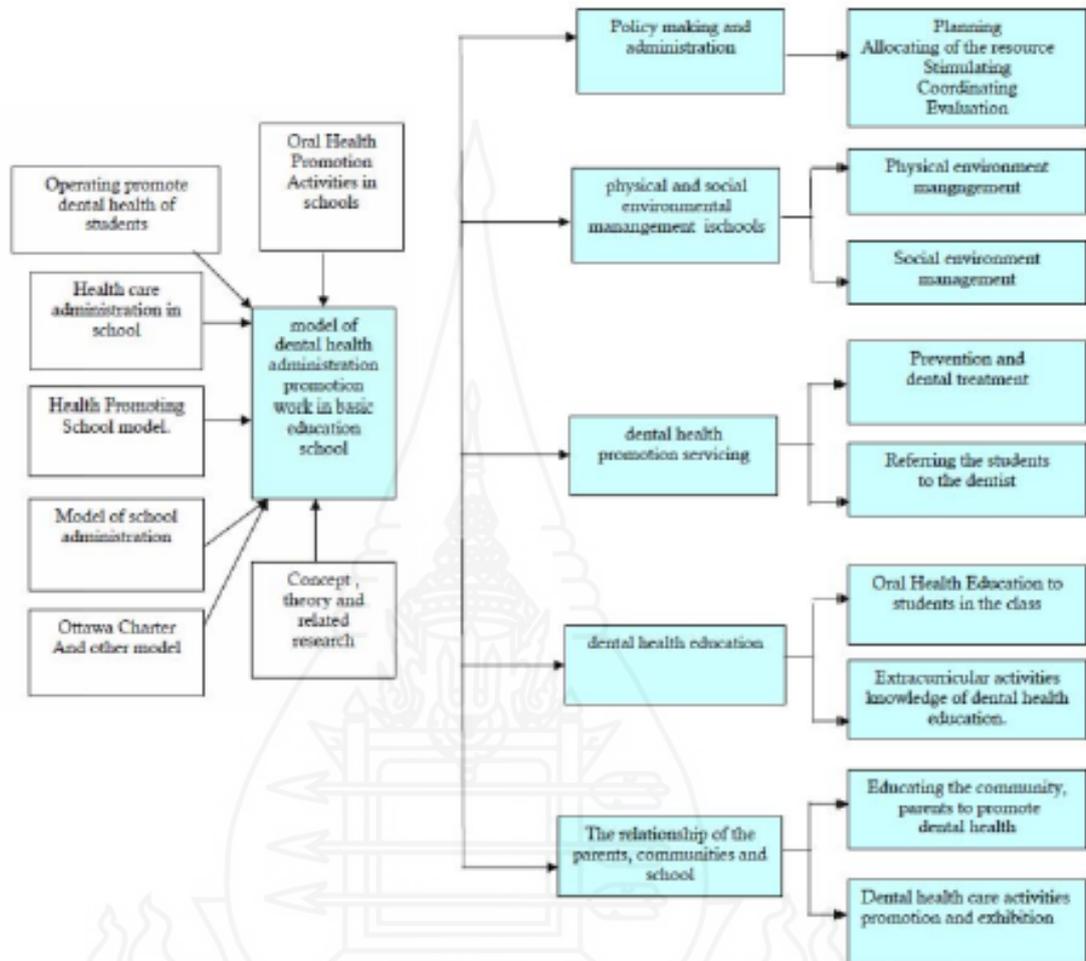


Figure 1: Conceptual Framework of the Developed Model

As Figure 1 shows, the developed model for administration of student dental health promotion work comprised five components as follows:

1. Policy formation and administration with five activities: planning, allocating of resources, stimulating, coordinating, and evaluation.
2. Physical and social environment management in school with two activities: physical environment management and social environment management.
3. Dental health promotion services with two activities: prevention and dental treatment, and referring the students to the dentist.
4. Dental health education with two activities: dental health education to students in the class and extra-curricular activities for dental health promotion.

- The relationship of the parents, community and school with two activities: educating the community and parents to promote dental health and dental health care activities promotion and exhibition.

Results of Model Verification by the Known-Groups Method

In the model verification by the known-groups method, data on the practices of administration of student dental health promotion work in the 36 best practice schools and the 36 general schools obtained by rating scale questionnaires were analyzed to obtain the overall, component, and activity rating means and standard deviations. Then the t-test was employed to compare the rating means of the two groups to determine significant differences. Results of the comparison are shown in Table 1 below:

Table 1: Comparison results of the administration practices of student dental health promotion work in 36 best practice schools and 36 general schools

Components and activities of administration of dental health promotion work in basic education schools	Best Practice Schools			General Schools			t	p
	Mean \bar{X}	Standard Deviation (S.D.)	Practice level	Mean \bar{X}	Standard Deviation (S.D.)	Practice level		
<u>1. Policy formation and administration</u>	4.02	0.57	High	3.51	0.60	high	11.76	0.00*
1.1 Planning	4.30	0.57	High	3.83	0.67	high	10.10	0.00*
1.2 Allocating of the resources	3.83	0.65	High	3.33	0.68	moderate	10.09	0.00*
1.3 Stimulating	3.90	0.68	High	3.37	0.70	moderate	10.13	0.00*
1.4 Coordinating	4.15	0.68	High	3.61	0.75	high	10.73	0.00*
1.5 Evaluation	3.90	0.70	High	3.40	0.75	moderate	9.10	0.00*
<u>2. Environment management in schools</u>	4.14	0.60	High	3.63	0.67	high	10.92	0.00*
2.1 Physical environment	4.06	0.64	High	3.55	0.75	high	10.21	0.00*
2.2 Social environment	4.20	0.63	High	3.69	0.71	high	10.13	0.00*
<u>3. Dental health promotion services</u>	4.39	0.59	High	3.89	0.70	high	10.38	0.00*
3.1 Prevention and dental treatment	4.46	0.55	High	3.86	0.73	high	12.50	0.00*
3.2 Referring the students to the dentist	4.33	0.73	High	3.93	0.83	high	6.91	0.00*
<u>4. Dental health education</u>	4.11	0.64	High	3.34	0.75	moderate	14.94	0.00*
4.1 Dental health education to students in class	4.11	0.63	High	3.49	0.72	moderate	12.54	0.00*
4.2 Extracurricular activities for promotion of dental health	4.10	0.72	High	3.18	0.86	moderate	15.54	0.00*
<u>5. The relationship of parents, community and school</u>	3.72	0.60	High	3.06	0.61	moderate	13.276	0.00*
5.1 Educating the community, parents to promote dental health	3.75	0.64	High	3.12	0.52	moderate	9.46	0.00*
5.2 Dental health care activities promotion and exhibition	3.70	0.65	High	2.99	0.69	moderate	10.25	0.00*
Total	4.06	0.55	High	3.49	0.61	moderate	13.276	0.00*

4.51 – 5.00 means very high level; 3.51 – 4.00 means high level; 2.51 – 3.50 means moderate level; 1.51 – 2.50 means low level; 1.00 – 1.50 means very low level

As Table 1 shows, the total or overall rating mean as well as rating means for all components and activities in the best practice schools group are at the high level; while in the general

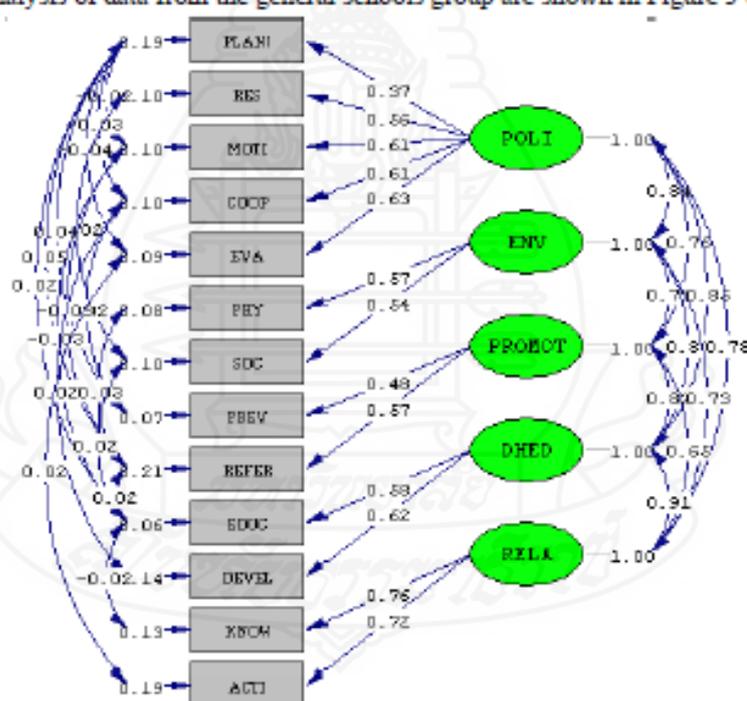
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schools group, the total or overall rating mean is at the moderate level only, and rating means for only three components, namely, policy formation and administration, environment management in school, and dental health promotion services are at the high level, also, rating means for only eight activities out of the total 13 activities are at the high level, with those of the rest being at the moderate level.

By comparison, every rating mean in the best practice schools group is higher than the counterpart rating mean in the general school group. The t-test results show that every rating mean in the best practice schools group is significantly higher than its counterpart rating mean in the general schools group at the 0.01 level. To conclude, the analysis results indicate that the developed model has validity, as it can discriminate the best practice schools from other schools in general.

Results of Model Verification by Confirmatory Factor Analysis

In order to confirm the validity of the model, data from the best practice schools group and data from the general schools group were analyzed with factor analysis. Results of factor analysis of data from the best practice schools group are shown in Figure 2, and results of factor analysis of data from the general schools group are shown in Figure 3 below:



Chi-Square=51.92, df=39, P-value=0.08069, RMSEA=0.030

Figure 2: Model of Dental Health Administration of Best Practice Schools by Factor Analysis

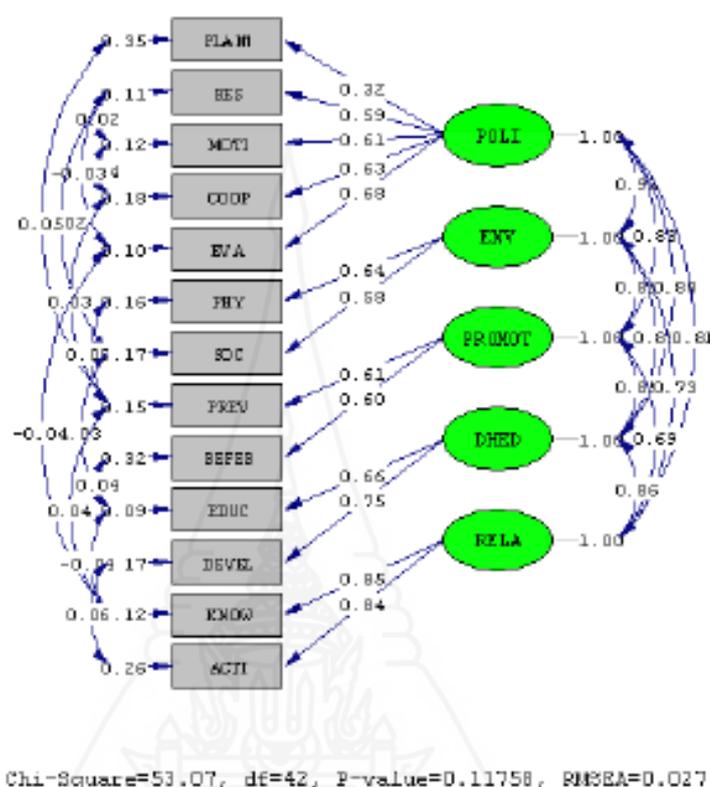


Figure 3: Model of Dental Health Administration of General Schools by Factor Analysis

As Figure 2 and Figure 3 show, results of factor analysis of the model in both the best practice schools and general schools confirm that the developed model comprises five components, namely, policy formation and administration (POLI), physical and social environment management in school (ENV), dental health promotion services (PROMOT), dental health education (DHED), and the relationship of parents, community and school (RELA).

Discussion

Based on the research results, the following points for discussion are presented:

1. Policy formation and administration are important to promote student dental health, for example: 1) a policy of environment management that is conducive to promoting health, such as adding fluoride in drinking water and the food is not harmful to student health in school; 2) nutrition policies, such as the provision of food shops in schools that are beneficial to health, encouraging children to eat fruit and vegetables including assessment of nutritional conditions in students; 3) policies do not prohibit the consumption of sugar, such as foods containing sugar and drinking a lot of sweet beverage in school; 4) policies to educate dental hygiene by working closely with other dental hygienists; and 5) policy development by students, teachers and community participation in the planning development process. Moyses, et. al.

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(Moyses, et. al, 2003 : 209-218) suggested that schools with a comprehensive curriculum were more likely to have a higher percentage of caries-free children and children in supportive schools have better oral health than those in non-supporting schools. And according to the research of Kanyarat, et. al. (Kanyarat, et. al., 2006: 95-101) regarding the curriculum, all schools had a policy to help students learn specific nutrition-related skills. All schools encouraged and involved staff, children family members and the community in supporting and reinforcing healthy eating policy. The results showed that although most schools were concerned about healthy eating policy, many policies had not been fully implemented. Therefore, a practical model for schools to implement healthy eating practice is still needed.

2. Physical and social environment management in schools are important to promoting dental health. Stella, et. al. (Stella, et. al., 2005: 679) suggested that a ban on selling unhealthy snacks in schools could be a starting point. Safe water and sanitation facilities are essential for tooth brushing drills and for controlling cross infection. Dental health promotion should also prohibit the sale of unhealthy foods and drinks to students in the vicinity of school premises.
3. The dental health promotion services by encourage dental health interventions, such as water fluoridation, topical fluorides and fissure sealants. (Watt, 2005: 711-718). In Thailand, strategy used to prevent tooth decay for elementary age children is to brush teeth with fluoride mixed toothpaste after lunch and fissure sealant.
4. Dental health education to students is important. Stella, et. al. (Stella, et. al., 2005: 679) suggested that the dental health knowledge to students in schools could be integrates in the contents of courses such as science by instruction on the body ,dental hygiene, oral microbial, and nutrition ; integrated with sociology such as race, culture and social care; integrated with mathematics such as tooth count. Chapman, et. al. (Chapman, et. al., 2006: 40-44) suggested that the aims of the National Curriculum should be integrated with dental health promotion practice. A more widely available teaching resource would be useful to encourage the teaching profession to take on dental health education without the more costly input from dental professionals.
5. The relationship of the school, parents and community is important too. The parents should be reinforced on dental care for children at home. The school project is to be initiated. Parents and community should participate in planning and decision making with a team like school health team and the Community Committee. Supunnee Thrakul (Supunnee Thrakul, 2007: 245-253) suggested that health screening and assessment in school children was to reduce the prevalence rate of health problems by having the parents' participation for health care of their children. The difference of health problems before and after intervention was statistically significant ($p = .001$). The participation of parents for health care of their primary school children was important for the success of school health services in the rural area that needed the cooperation from community health nurses, school children, teachers, and especially parents.

Recommendations

The main recommendation from this study is that since the developed model for administration of student dental health promotion work for basic education schools in Thailand has been proved to have validity, it should be implemented in Thai basic education schools in order

to standardize and enhance the practice for administration of student dental health promotion work in basic education schools in Thailand.

Conclusions

The developed model for administration of dental health promotion work in Thai basic education schools comprises five components: policy formation and administration, physical and social environment management in school, dental health education, dental health promotion services, and the relationship of parents, community and school.

Verification of the validity of the model by the known-groups method and by confirmatory factor analysis shows that the developed model is valid. Therefore, it should be implemented to standardize and enhance the practice for administration of student dental health promotion work in basic education schools in Thailand.

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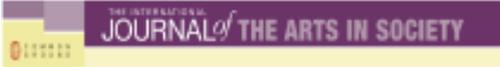
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