

Chapter VI

Conclusion and recommendation

6.1 Conclusion

A school-based oral health preventive program had been conducted in public primary school in Bangkok which based on community-based learning and teaching for the fifth year dental students at the Faculty of Dentistry, Mahidol University, as a demonstration program to test the combined effect on dental caries of several preventive services. This program had provided oral preventive care for school children who were aged 6-7 years. The five-year program began in 1995. The program consisted of regular oral health education sessions, pit and fissure sealant, fluoride mouthwash and fluoride-containing paste, and PRR. These dental cares were provided on site at two schools, with the use of two vans, dental mobile units, saving time and expense in school hours lost and transportation costs.

6.1.1 Effective oral health preventive program

Based on secondary data, caries experience in permanent teeth of school children in experimental group after five-year implementing this program indicated a low degree of success. The caries increment of permanent teeth in the experimental group, contrasted to those in the control group, showed the net reduction in caries of 23.59%. The difference of DMFT score after implementing the program between two groups of study, one implementing this program and the other not implementing the program was statistically significant. The results obtained at the end of five years indicated that a school-based oral health preventive program may have potential for preventing and controlling dental caries in school children but at a low level. However, the final DMFT still fail the national oral health goal which set the target at $DMFT \leq 1.5$. The national survey in 2000 also reported a 1.6 DMFT for a typical 12-year-olds child, obviously without the benefit from similar program.

6.1.2 Costs to provider analysis

The analysis of costs to provider for establishing and operating this program found that the total costs of this program included the capital costs and recurrent costs. The capital costs were a mainly part of them. The percentages of capital costs and recurrent costs varied between 61.76% – 68.47% and 31.53% – 38.24% respectively. Among capital inputs, costs of dental equipment are responsible for more than half of total costs. The changes of interest rate and 20% increasing cost of dental equipments did the highly sensitive on total cost and cost-effectiveness ratio.

According to material costs, costs of material for pit and fissure sealant were a main part in these costs of this program, that is, this program mainly focused on providing pit and fissure sealant. It is concluded that fissure sealant have a worthwhile contribution to make when used as an integral part of a total preventive regime which includes the use of fluoride, PRR, and oral health education. With their intelligent use it should be possible to preserve many more dentitions free of caries into adult life.

6.1.3 Cost-effectiveness analysis

The cost-effectiveness ratio varied on the assumption used for calculation. The primary analysis estimated the overall five years cost-effectiveness ratio of 1,677.38 baths per DMFT prevented. But the actual cost-effectiveness for five years implementation this program by the Faculty of dentistry equal to 1,490.33 baths per DMFT prevented.

As mentioned above, the data collected in this study were based on the secondary data. It was lack of available data. The assumptions were needed. It should therefore be interpreted with some caution.

6.2 Recommendation

According to the analysis of the impacts of a school-based oral health preventive program on dental caries and cost-effectiveness analysis of this program, the following issues should be mentioned.

6.2.1 Policy implication

6.2.1.1 Implementation this program in the other schools

As a result of this analysis, it will be evident that the effectiveness of the implications of adoption is a matter of practical relevance to policy makers. The decision makers in other dental schools should establish this school-based oral health preventive program in one of their dental student's principles. There will be greatly useful both for community-based learning of their dental students and for benefit to the children who had less opportunity to receive dental caries. This program should be expanded for implementing into the other public primary schools implemented by dental students for education or implemented by dental team at those schools as an essential oral preventive program where organized school dental care is not available. The government may provide by themselves or as the third party and contracting with the private clinic for providing this program by using reimbursement system. However, before introducing such a program, the governmental sponsoring agency will need to address a number of key issues.

First, a modeled economic evaluation should be undertaken to extrapolate the potential costs and outcomes over a longer time frame (e.g., 10 years) to the children in these schools implemented and to other regions in Thailand. Since the dental caries is a slowly progressing disease, program analysis must be continued for several years to measure the true costs and outcomes.

Second, a decision will need to be made on the appropriate mix of service providers. For example, a dental nurse potentially can be substituted for a dentist to provide the preventive program. This action has the potential to reduce overall costs because of lower wages of dental nurses. Besides, the dental preventive care is the responsibility of dental nurses in the community hospitals.

Third, the policy makers should consider and given the targeting for reducing dental caries and their budgeting for supporting this program.

6.2.1.2 Implementation this program at public health center (Sathani Anamai) in rural area

According to the fifth national oral health survey in 2000, DMFT of 12-year-olds children was 1.6 which could not achieve the national oral goals by the year 2000, $DMFT \leq 1.5$. As shown in sensitivity analysis on excluding transportation cost; total cost, average cost, ICER and cost-effectiveness to provider of program were extremely decreased. Additionally, effective in caries reduction of the school-based oral health preventive program, it should be established and operated at public health center (such as Sathani Anamai) in rural area. The patients (school children and their parents) have to bare the burdens of transportation costs. Not only the transportation costs which the patients would be undertaken, the opportunity costs of parents also be included. Parents who accompany with children to receive the dental care, will loss the wages in that day because of stop working. Therefore, before the decision maker implement a similar program in their areas, the following issues should be considered.

1. There are budgets enough for establishing and operation this program in public health center
2. The proportion of dental manpower and children in those areas is appropriate.
3. Both parents and children should give the full cooperation to this program in order to receive the dental care at the public health center as much as possible. If the patients do not participate in this program and suffer from dental caries, then the effectiveness will be decreased.
4. The decision makers should consider the cost-effectiveness of this program and compare with the other programs in societal perspective in order to achieve the oral health goals.

6.2.2 Including patient and societal perspective

The intangible benefits of an improvement in a child's quality of life associated with reductions in dental caries and improvements in tooth survival has not been captured in this analysis. Also, the predicting potential savings of parents and communities of children for reducing the experience of dental caries compared with the placement of conventional restoration, such as amalgam restoration, did not address in this analysis. For completely baseline information, this study should therefore includes the patient and society point of view both costs and benefits in further researches. The patients or parents will pay out-of-pocket for dental treatment in the private clinic or hospital if the children not participated in this program suffered from dental caries.

6.2.3 Comparing with conventional restoration

There should be further research associated with comparing this oral health preventive program with the conventional restoration about cost-saving and benefits. For example, the benefits in monetary term of one DMFT prevented in all prospective; patient, provider and society for collecting completely baseline information. It will improve data for policy makers to implement this program in their region.

6.2.4 Prospective study

Because of lack of data available in this analysis, particularly information of children patient, the further research should be the prospective study. There should be set the method for collecting the data required before implementing this program in order to get the completed data required to calculate the accurate baseline.

6.2.5 More utilize

As mentioned above, the dental equipments were used by only 1,300 school children a year for 6.5 month per year and half of day per visit. It means that using of dental equipments is not achieving economies of scale. Then, the dental equipments in this program should be more used by the other programs in order to be less assigned costs to this program. Then the cost-effectiveness of this program will be decreased. There are three possible ways for more utilizing these dental equipments. First, there should be this program at the other schools or public dental services. Second, the dental students provide this program for full day per visit to the school children. Third, this program should be implemented at public primary schools in rural area. Because there are school children more than that of in urban area, using of these equipments will achieve economies of scale.

6.2.6 Improving qualities of dental services

The quality of dental service should be improved by purchasing new equipment which more facilities (such as high power suction), or introducing new technique. Moreover, the government should support for further research and development associated with invention of local dental equipments and materials for oral preventive care. The dental equipments and materials should be improved. Furthermore, the providers should buy the local equipments and materials which the costs are lower. Then cost-effectiveness of this program will be decreased. However, the higher efficient dental equipment and higher quality of dental materials are usually more expensive than the conventional equipments and materials. The policy makers have to spend much more budgets for introducing such new equipments or materials and make their decisions whether these equipments and materials should be introduced by comparing with the following effectiveness. For example, these equipments can reduce the time usages which create more effectiveness of this program. If the costs increase less than increasing effectiveness and they can be affordable these higher costs, then these equipments and materials should be introduced.

6.2.7 Costs for achieving the national oral health goals

As shown in section 4.3, ICER was 5,432.66 baths. That is, the providers had to spend 5,432.66 baths per additional DMFT prevented over 5 years implementing program. From the national oral health goals by the year 2000, the DMFT should be equal or less than 1.5 at 12-year-olds child, and the DMFT after 5 years program of experimental group was 1.6 which was more 10% than the DMFT's goals. Therefore, if the policy makers intend to achieve this goal, they have to put extra effort by spending additional cost at least 543.26 baths ($5,432.66 * 10\% = 543.26$) per person over 5 years. These figures were assumed in certain criteria that ICER was the linear function.

6.3 Limitation of study

There are weaknesses associated with this analysis and with the evaluation of preventive dental techniques as a whole which should be considered. Several limitations are inherent to this analysis.

6.3.1 Lack of detail data

The study is observational. It used retrospective data in which school-based oral health preventive program occurred as a result of community-based learning of dental students. It should be mentioned here that, this study was based on the secondary data, and then some detailed data required for this analysis were unavailable. Due to lack of detailed data, the assumptions were set. For example, it was lack of detail in socioeconomic status of school children. The other was lack of detail of DMFT index in control group for calculating DMFT weighted by number of teeth (DMFT_w) of children. If this program can compare the DMFT_w, there will be better and more accurate baseline data.

6.3.2 Non-estimated long-term cost and benefit

One important problem in this and the other studies is that it is concerned with costs and their outcomes only for the period of the program; we are unable to estimate the longer-term benefits that may accrue from the preventive (caries-free) side of the comparison nor have we made estimates of the recurrent cost of renewing sealant which have a limited life. Because the costs for preventive program mainly incurred at the start of the program, but the benefits of this program usually occur at the long-run future. The difficulties in overcoming these problems will be obvious but it does seem reasonable to argue that the longer-term dental history of a child reaching a given age with a reduced experience of caries is likely to be more favorable (and less costly) than that of a child whose carious teeth are simply restored.

6.3.3 Non-randomized design

The other problems are children were not randomly assigned to receive program as in a randomized clinical trial. It leads to selection bias in the preventive program. This bias could cause an underestimate of this oral health preventive program's effectiveness, making the effects of this program appear less favorable than they might be otherwise. It is possible, however, to speculate on the direction of bias that may have been introduced by the non-randomized design.

6.3.4 Non-comparing with conventional restoration

Furthermore, there is the other weakness related to this analysis, that is, this study did not compared with alternative restorative procedures. For example, comparing with the placement of amalgam restorations in children in whom this oral preventive program was not utilized as a preventive material. If this analysis did compare with the conventional restoration, it could be presented in wider aspects of value of this prevention of dental program. The policy makers will take this baseline information compared for making their decisions in their dental health policies in order to achieve the national or global oral health goals.