Abstract

**Background:** More than three quarters of the school children in Mae Chan and Mae Fah Luang district had dental caries. To reduce caries prevalence in primary school children, the integration of oral health promotion into community health is necessary. This paper reports on communities-based participatory action research carried out in 14 sub-districts with partners inside and outside of the health care sector.

**Methods:** The study was carried out from 2013-2015 through communities-based participatory action research. This project included; diagnosis of oral health problems in community schools with action taking with school health promotion, impact evaluation with the dental caries assessment on school children, reflection of lesson learned with researcher and partners, focus group discussion and expansion of the project to other communities over 12 months period.

**Results:** Communities-based participants included 96 partners from 14 sub-districts (e.g. Child Care Center staff, Hospital and Health Promoting Center staff) and 432 students from 61 schools. As a result, the caries prevalence of student decreased from 79.06 in 2013 to 54.9 in 2015. The communities-based survey of oral health problem, pilot study and expanding project findings were identified as a key source of information for planning change, the new trend of food consumption, oral health situation of primary school students and the key partners outside the health care sector. All partner sectors also focused on raising awareness of oral health problem, improving ownership and securing the project with financial support.

**Conclusion and recommendation:** The study findings were identified as an important source to recommend for policy and pragmatic action; increased cross-cultural awareness, building partnerships outside of the health care sector to participate, shared ownership of the research and supported budget allocation.

**Keywords:** communities-based participatory action research, partnership, oral health promotion in school
Introduction:

Dental caries remains a public health problem in many countries, even though it is preventable. It is one of the most common diseases of childhood, which can develop as early as the primary teeth begin to erupt.

In Thailand, research on the oral health of children age 12 years for the period 1984-2007 found an increase in tooth decay from 45.8% to 56.87% and reaching over 59.32% in rural areas (Tuchinda, 2004). In northern region, the caries prevalence was 52.8 in 2012 (Department of Health, 2012). In Mae Chan and Mae Fah Luang districts, more than three quarters of the school children had dental caries (79.06% in 2013). That is higher than Thailand national and northern regional caries prevalence.

The WHO Oral Health Programme supports the development of oral health services that matches the needs of the country. Particularly for the developing countries, community care models for essential oral health are encouraged and several demonstration projects based on socio-cultural conditions are supported (WHO, 2016).

Department of Dentistry at Mae Chan hospital has followed community-based participatory action research (CBPR) approaches to promote caries prevention in 14 sub-districts since 2013. Communities-based participatory action research is a partnership approach to research that equitably involves, for example, community members, organizational representatives, and researchers in all aspects of the research process and in which all partners contribute expertise and share decision making and ownership (Israel et. all, 2008).

This study demonstrated a two-phase project that calls for partnership building aimed at community mobilization to increase knowledge and understanding of a community-based participatory action research (CBPR) approaches and integrate the knowledge gained with interventions and policy and social change to improve the oral health and quality of life of community members.

Methodology:

Study design

Both quantitative and qualitative methods were conducted to inform the development of a project of community-based participatory action research. The research was divided into 2 phases, phase I with quantitative cross sectional survey of the primary school students’ oral health status and qualitative pilot studies were conducted to inform the development of a project of community-based participatory action research, Phase II Expand community-based participatory action research in 14 sub-districts and evaluated primary school student oral health outcome include the important key success of this project.

Project areas

These projects were conducted in 11 sub-districts at Mae Chan district and 3 sub-districts at Mae Fah Luang district. These areas reflect high rates of caries prevalence, but they have different socio-cultural conditions. Mae Chan and Mae Fah Luang district has several hilltribe
villages such as those of Akha, Taiyai, Lahu, Lisu, Hmong and Mien. The 10 school in order of pilot study were Ban Mae Chan School, Anuban Chom Sawan School, Ban Mai School, Anuban Chan Chwa Tai School, Ban ThaKhaoPlueak School, Ban Mae Chan School, Ban San Ti Suk School, Ban Wiang Sa School, San Sai School and Ban Mae Kham Sop Paen School.

Participants
The key partner participants were recruited between 2013 to 2015 by purposive sampling of 69 Child Care Center staff, 27 Health care staff and accidental sampling 432 of primary school students from Mae Chan and Mae Fah Luang district.

Ethical approval
The research was approved by the Ethics Research Committee of Mae Chan Hospital. All participants were informed about the content and detail of the study, process of consent identification, privacy protection, confidentiality, and right to withdrawal from research project. All informants signed the consent sheet before the data collection began.

Phase I – diagnosis oral health problems in communities and pilot study
Research agenda of this phase include 1) Identification of the importance of oral health problems in communities. These processes carried on 3 months in Mae Chan and Mae Fah Luang districts and 2) Pilot studies were carried out by researcher and partners inside and outside health care sector to identify the barrier and facilitator that affect dental caries management in school children. The 10 pilot school studies also helped to identify the key partner groups involved in oral health promotion project and were a resource to inform the development of solutions to improve the oral health promotion project in phase II. The aim of phase I was to foster a process of community-based participatory problem diagnosis, concern and share experience and ownership.

Phase II – Expand community-based participatory action research covered 14 sub-districts
The second phase comprised a 12 month project of expanding community-based participatory action research which covered 61 schools in 14 sub-districts.

Data collection and analysis
The method employed during this study may be grouped in the following manner:

Communities and School survey
A community-based survey of oral health problem was developed in Mae Chan and Mae Fah Luang district by researchers (dentist), 6 dental interns, dental assistants and dental health promotion from Mae Chan Hospital. A School survey was conducted in 2013-2014 with 140 students from 10 pilot primary schools by Geo-social mapping to identify the physical environment, social space and risk space in school. Then, a school survey participation was extended to 432 students from 61 schools in 2015.

Caries prevalence survey
The caries status of the children was assessed according to WHO criteria (WHO, 1997) using an intra-oral mouth mirror. Caries was assessed using the DMFT index. Oral health in primary school student was surveyed and diagnosed by researcher (dentist), dental hygienist, dental assistant and oral health promoter from department of dentistry, Mae Chan hospital.

**Focus groups**

The researchers worked in partnership with participants on focus group discussion sessions which were held with 69 Child Care Center Staff, 27 Health Care Staff. These focus group sessions were conducted from 2013-2015 and were designed to provide a diverse set of communities-based oral health issues. All partners playing an important role were members of the oral health promotion committee that establish the mission, goals, objectives, and principles for oral health promotion project, shared experience, finalized research results and reflection of team learning.

The first focus group discussion entailed a discussion between the researcher and staff of department of dentistry, Mae Chan Hospital on the important factors that are associated with dental caries in primary school students. We summarized that partners’ awareness and participation in oral health promotion was the major key for solving this problem successfully.

In the second focus group discussion, the researcher sent oral health survey data to all partners (69 Child Care Center Staff and 27 Health Care Staff) by identifying the primary school students’ oral health status in order to improve oral health problem awareness in all partners. Then we divided partners into 8 groups to discuss what we think/feel about students’ oral health situation, how to solve the problem, who should participate and how to start the problem solving process?

In the third focus group discussion, the researcher and 140 students (pilot school studies, 2013-2014) discussed the data that showed the students’ oral health status. We identified the factors that are associated with dental carries in students. Then 1-day training was provided to primary school students with sufficient knowledge, skills to recognize basic oral health problems and constructed school mapping to perform basic oral health promotion activities in school. Afterwards, we employed this pattern with 252 students in 61 school (phase II, 2015).

**Participation activities**

In 2013-2015, to encourage the concept of oral health promotion in schools, Think before Pick Project was developed in primary schools and it included training for students concern on sweet foods control in school, the regular tooth brush after launch and physical environment in school that related to dental carries and dental trauma. This project supported 432 young speakers to provide knowledge of caries risk factor and prevention in their school. Students developed the oral health promotion activities in their school including confectionary shop survey, offered tooth brush after launch campaign, provided the activities “Think before Pick” and presented the oral health issues in school to principal and parent teacher committee.
Results:

Ethnographic information

The population of Mae Chan district and 3 sub-district of Mae Fah Luang is approximately 130,000 people, it includes 6 main ethnic group; Akha, Taiyai, Lahu, Lisu, Hmong and Mien, who speak a range of dialects that are more closely related to the speech of Sino-Tibetan than to that of Thai. The settlement of each village is usually clustered and composed of the extended- stem families and skip generation. Most families have members-daughters, sons, husbands, wives, fathers or mothers who were away working in the big city or abroad, as such leaving their grandparents with the responsibility of raising their grandchildren with little to no assistance from the parents. Most village household were involved in some form of cash-crop production, particularly of rice and corn, for their own consume and sale on the market. But most villagers are landless or small land owners.

In the survey of ethnic villages about their medical system, there are magicians (the so called “Mao Muang”) herbalist (Buddha belly plant stem, Ground clove and Mint leave for the relief of toothache) legal and illegal dental clinic. Villagers have also started to accept the new trend of food consumption in the form of sweetmeats, sweets and drinks, including sugar added in various foods. Primary schools are not left out as sweet and soft drinks are also available there.

Establishing a partnership

14 sub-districts representatives agreed to become partners and began working closely with the department of dentistry of Mae Chan hospital to take stronger and more directive roles in the research process. From 2013 – 2015, there were 69 participants from Child Care Center, 432 students from Primary School, 24 health care staff from Health Promoting Hospital and 3 health care staff from Urban Health Center. All partners were promoted a co-learning and empowering process that attends to the knowledge of community members, and an emphasis on sharing information, decision making, power, resources, and support among members of the partnership

Table 1 Number of participants attending per sectors from 2013-2015

<table>
<thead>
<tr>
<th>Years</th>
<th>Child Care Center</th>
<th>Primary School</th>
<th>Health Promoting Hospital</th>
<th>Urban Health Center</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>10</td>
<td>40</td>
<td>24</td>
<td>3</td>
</tr>
<tr>
<td>2014</td>
<td>28</td>
<td>140</td>
<td>24</td>
<td>3</td>
</tr>
<tr>
<td>2015</td>
<td>31</td>
<td>252</td>
<td>24</td>
<td>3</td>
</tr>
</tbody>
</table>

Improving communities’ participation

All partner sectors identified four actions that would be practical and were agreed as important to work on during the communities-based action research. All partner sectors
completed 4 main activities including-establishing a partnership, communities capacity building, improving communities participation and offering ownership. All partners took part and shifted over time with new emerging partners since 2013-2015.

**Table 2 Main activities**

<table>
<thead>
<tr>
<th>Type of Activities</th>
<th>Child care center</th>
<th>Primary school</th>
<th>Health promoting hospital</th>
<th>Urban health center</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Establishing a partnership e.g. communities oral health committee, shared experience</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>2. Communities capacity building e.g. staff training, school survey</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>3. Improving communities participation e.g. focus group discussion, Think before Pick Project</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>4. Offering ownership e.g. identified risk factors, planned solution, finalized research and lesson learned meeting</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

**Improving dental caries outcome**

Out of the 2,364 primary school students in 61 schools examined for dental caries, 51 per cent were girls and 49 per cent were boys. The total sample then comprised students at grade 1 (mean age 7), grade 3 (mean age 9) and student at grad 6 (mean age 12)

Based on the caries survey in communities, the total dental caries prevalence among the school students from 2013 to 2015 were 79.00, 68.33 and 54.90 respectively. Hence, the caries prevalence decreased as the years of project advances.

**Table 3** Caries prevalence in 2,364 primary school students in 61 schools (14 sub-districts) from 2013-2015

<table>
<thead>
<tr>
<th>Years</th>
<th>Caries prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>79.06</td>
</tr>
<tr>
<td>2014</td>
<td>68.33</td>
</tr>
<tr>
<td>2015</td>
<td>54.90</td>
</tr>
</tbody>
</table>

**Securing financial support**

In 2014, the termination of Dental Funds was a big barrier of oral health promotion in primary schools, to help secure future financial support for oral health promotion project, which was required because of short-term funding arrangements. The local health promotion funds committee participated in the preparation to support budget for 2 oral health
promoters (who were assigned to co-ordinate all partner sectors and provide oral health assessment and caries prevention campaign in Child Care Center) due to the all partner sectors concern on the project continuum and realize the oral health outcome that emerge with children.

**Discussion:**

Oral health promotion through communities-based participatory action research are promoted as useful tools for studying implementation and for reducing carries prevalence in cross cultural communities. A recent project evaluation and reflection of team learning identified key challenges to achieving goals for reducing oral health disparities.

Increased cross-cultural awareness, the use of communities’ data is extremely important. A true picture of a community’s needs and problems cannot be determined without a comprehensive community assessment especially in multi-cultural communities. This was according to Westby & Hwa-Froelich (Westby & Hwa-Froelich, 2003). An understanding of cultural variations in values is essential for the successful implementation of participatory action research and will reduce miscommunication and incorrect interpretations of behaviors.

In Mae Chan and Mae Fah Luang districts, there are several hilltribe villages such as those of Akha, Taiyai, Lahu, Lisu, Hmong and Mien with each group has specific social, political and cultural setting. Communities-based participatory action research provides the opportunity to spend time with individuals who are culturally, socially, and economically identity that facilitate the development of programs effectively.

Building partnerships outside the health care sector contributed unique strengths and shared responsibilities in all phases of the research. According to Altman (1995), to change project delivery from an experimental context controlled by researchers to project controlled by community organizations and sustaining long-term effects of interventions, building partnerships are needed. Therefore community intervention be more sufficient and sustainable by local-level stakeholder collaboration with health care staff compared to a top-down approach.

All partners participate as equal members and share control over all phases of the research process, e.g. problem definition, interpretation of results, and reflection of learning to address community concerns. But the reciprocal transfer of knowledge, skills, capacity, and power between researchers and partners should be of concern.

Empowerment is a crucial underpinning concept to Communities-based participatory action research. Communities-based participatory action research knowledge is active and not passive (Cammarota & Fine, 2010). Think before Pick project, students learn how to study problems, launching pads for ideas, find solutions and strategies to initiate social change in their school.

Shared ownership of the research is the important key for oral health solution achievement (Kemmis, 2006). If the problem identified by the researchers is viewed as important by communities members or gatekeepers, or if the problem is identified by communities or partners itself, how the problem is viewed is important (LeCompte & Schensul, 1999). In this
research, we produced a long-term commitment to effectively improve oral health status through the communities-based participatory action research approach which included; identified risk factors, planned solution, finalized research and lesson learned meeting.

Supported budget allocation: the partners frequently discussed about barriers to process oral health promotion in communities, budget allocation is one of the major concerns. To secure future financial support, establishing relationships with local decision-makers could be addressed (Taylor et al., 2015). For project sustainability, Tambon Health Promotion Funds (Local health promotion funds) supported the budget for 2 oral health promoters to coordinate with all partners and precede dental caries prevention and control in Child Care Center and Primary school.

Conclusion:
This study draws attention to oral health promotion through communities-based participatory action research which is a tool for developing the concept of partnership, building communities capacity and ownership in order to improve oral health status and equity. Meanwhile, the increased cross-cultural awareness, building partnerships outside of the health care sector, shared ownership of the research and securing financial support were an important source to sustain oral health promotion project in communities.

Reference