

BARRIERS AND FACILITATING FACTORS AMONG LAY HEALTH WORKERS AND PRIMARY CARE PROVIDERS TO PROMOTE CHILDREN'S ORAL HEALTH IN CHON BURI PROVINCE, THAILAND

Tippanart Vichayanrat¹, Allan Steckler² and Chanuantong Tanasugarn³

¹Department of Community Dentistry, Faculty of Dentistry, Mahidol University, Bangkok, Thailand; ²Department of Health Behavior and Health Education, School of Public Health, The University of North Carolina at Chapel Hill, USA; ³Department of Health Education and Behavioral Science, Faculty of Public Health, Mahidol University, Bangkok, Thailand

Abstract. This study explored the barriers and facilitating factors among lay health workers (LHWs) and primary care providers (PCPs) in implementing a multi-level program to promote children's oral health care in a rural Thai community. Twelve focus groups and 11 in-depth interviews were conducted with LHWs and PCPs who implemented the program from January 2008 to January 2009. The findings showed that the PCPs encountered the constraints of time and human resources, lack of ownership, and problem of coordination with the district hospital. The barriers among LHWs during home visits were related to their assumption of caregiver's knowledge, some conflicting beliefs, and limited counseling skills. The facilitating factors were the training program, caregivers' positive feedback, and available resources such as brochures and toothbrushes. The PCPs identified LHWs as the main facilitators of the program and indicated that policy should be developed for better integrating oral health services in local health centers. This study provides a better understanding of the barriers and facilitating factors to promote children's oral health in rural Thai communities. While the barriers to integrating oral health activities to primary care are complex, the use of LHWs to promote the children's oral health was feasible and should be supported.

Keywords: oral health care, health education, health promotion, oral health, primary health care

INTRODUCTION

Although dental caries are largely preventable, they have been identified as the most common chronic disease of

childhood. Many children in both developed and developing countries, especially those from deprived areas, are affected by dental caries and suffer from unnecessary dental pain and infection (De Grauwe *et al*, 2004). In Thailand, dental caries in young children have continuously increased during the past two decades. The sixth Thai National Oral Health survey in 2006-2007 found that 80.6% of 5-6 year-old and 61.4% of 3-year-old children were affected by

Correspondence: Tippanart Vichayanrat, Department of Community Dentistry, Faculty of Dentistry, Mahidol University, Yothi Road, Bangkok 10400, Thailand.

Tel: 66 (0) 2200 7809; Fax: 66 (0) 2200 7808

E-mail: tippanartv@hotmail.com

dental caries (Ministry of Public Health, 2008). Caries start very early and progress rapidly among children in rural areas (Vachirarojpisan *et al*, 2004). The study demonstrated that in 15-19-month-old children the prevalence of dental caries was 82.8% including non-cavitated caries (Vachirarojpisan *et al*, 2004). Therefore, in order to prevent early childhood caries (ECC) an effective intervention should start early and must be continued through the preschool years.

Because primary care providers (PCPs), such as pediatricians and family care providers, see children more frequently for vaccinations and other pediatric care, they could serve an important role in influencing health behavior among caregivers. Several studies have reported on the utilization of pediatric and family medical providers, including physicians, physician assistants, and nurse practitioners, to help promote children's oral health (Rozier *et al*, 2003; dela Cruz *et al*, 2004; Riter *et al*, 2008; Beil and Rozier, 2010). A recent study suggested that health providers' recommendation that pediatric patients visit the dentist was associated with an increase in dental visits among 2 to 5 year-old children (Beil and Rozier, 2010). However, there were many difficulties to integrate oral health into primary care services. One author (Rozier *et al*, 2003) reported on the barriers to engaging primary medical care providers in the provision of oral health services, including lack of knowledge and skills, and the most challenging barrier was the demand on primary care providers' time.

Lay health workers (LHWs) have been utilized to promote a variety of health issues. Although many terms are used to refer to LHWs in different cultures and countries, such as lay health

educators, community lay workers, or lay health advisors (Liebman *et al*, 2007; Lujan *et al*, 2007; Rhodes *et al*, 2007), they share similar characteristics, including coming from the community in which they work, providing a linkage between health services and people in the community, and are trained to provide basic health care and deliver health information. These characteristics of LHWs allow them to influence the health behaviors of people in their community. Studies have demonstrated the effective use of lay health workers in community-based programs to change various health behaviors, including breastfeeding, use of pap smear tests, and breast cancer screening (Lujan *et al*, 2007; Mock *et al*, 2007; Han *et al*, 2009). Harrison and Wong (2003) reported on the use of a lay health worker to provide one-to-one counseling with telephone follow-up, supported by community-wide activities that facilitated less use of sleep-time and daytime bottle use for children. Among the few oral health program that utilized LHWs, the barriers and facilitating factors to effectively employing LHWs have not been reported (Harrison and Wong, 2003; Lekswat and Promchai, 2007).

Because of the potential of PCPs and LHWs to help promote oral health among young children in the community, we developed and implemented a pilot multi-level oral health program utilizing both PCPs and LHWs in Thailand from January 2008 to January 2009. This manuscript reports our findings concerning the barriers and facilitating factors among PCPs and LHWs to promote children's oral health care in rural Thai communities. Both qualitative and quantitative methods were employed to understand their barriers and facilitators during program implementation and evaluation.

MATERIALS AND METHODS

Site description

The study site was in Phan Thong District in Chon Buri Province, Thailand, which is located about 80 km east of Bangkok. It has a population of 47,404. In 2007 the average annual household income was THB 290,342 (USD 7,258) (Ministry of Interior, 2007). Ninety-five percent of the population is Buddhist, and the majority of the population works in industry and agriculture. The fluoride concentration of the natural drinking water in this area is low, ranging from 0.1 to 0.6 parts per million. The district is subdivided into 11 *tambon* (sub-districts), which are further subdivided into 76 villages. Each *tambon* is served by a health center and a district hospital. Each health center has 2-4 staff (eg, public health officers, public health technical officers, registered nurses, dental nurse). Two major sources of funds for health centers include the national universal coverage capitation, and allocations from the local government. The study reported here was conducted in four *tambon* health centers.

Program description

The intervention was developed to address the determinants of behaviors at the intrapersonal, interpersonal, organizational, and community levels based on the Social Ecological Model (McLeroy *et al*, 1988). The program was designed to change caregivers' (ie, parents, grandparents, or other responsible adults) practice through the enhancing of oral health education and services at health centers, and to increase community awareness and social support through LHW networks.

During the preparation phase the researchers had group discussions with LHWs and PCPs on intervention devel-

opment. It was found that PCPs were unaware of the high prevalence of dental caries among preschool children, and some of them thought that caries prevention among children was almost impossible. Therefore, the PCPs' training curriculum focused on increasing awareness, perceived risk and severity of early childhood caries (ECC), and skill development, based on the Health Belief Model and Social Cognitive Theory (Baranowski *et al*, 2002). The methods included using slides to present the situation and severity of ECC in the community, illustrate the characteristics of initial caries, the consequences of ECC, discussing the four important oral health behaviors (ie, children's tooth brushing, bottle feeding, controlling sugary snacks, and use of fluoride supplement) and the key messages to deliver to caregivers, demonstrating and practicing of the use of fluoride drops, and oral screening in the health center setting.

LHWs who were village health volunteers from four *tambon* health centers in Phan Thong were invited to oral health training. Forty-nine LHWs participated in the one-day training. The objectives of the training were to increase awareness of ECC, increase perception of risk and severity of ECC, and increase knowledge of the four oral health behaviors. The training was also designed to increase the LHW's outcome expectation for their home visits, and to increase their skills and confidence in providing information, giving advice, and encouraging caregivers in regards to oral health practice. The training methods included dividing LHWs into four groups, and each group rotated to attend the four different activities, including presenting the caries situation and early sign of caries, discussing about the role of LHWs and healthy oral health behaviors, practicing of children's

tooth brushing, and role play about home visits. The LHWs' training was carried out by the researcher (a dentist), three dental nurses, and two volunteer dentists from the Phan Thong provincial health office.

The training and other planning activities resulted in an intervention that consisted of three main components: 1) home visits by LHWs to provide social supports for caregivers. The LHWs visited caregivers every three months to follow-up their children's oral health care and focused on three areas of social support including informational, appraisal, and emotional supports to caregivers. This component aimed to change the environment at the interpersonal level; 2) oral health education and services at health centers was aimed at the interpersonal and organizational levels. PCPs gave structured oral health education, oral health screening and referral for dental treatment, prescribed fluoride supplements, and gave toothbrushes/and or toothpaste to caregivers every three months during their regular vaccination visits; and 3) community mobilization process that intended to change the environment at the community level. This component aimed to increase the awareness of the ECC problem among community leaders and members and to increase participation in promoting children's oral health. Members of the Tambon Administrative Organization (local government), day care teachers, and LHWs were invited to meetings during the program. The background and prevalence of ECC in each community were explained to increase awareness of the ECC problem. Group meetings were conducted to allow the representatives from the community to identify their roles to prevent ECC in their community.

The Mahidol University Institutional Review Board (MU-IRB) approved this

research project (Ref N° MU 2007-272; 2007 Dec 7). All LHWs and PCPs were explained the purposes of the study, and written informed consent was obtained prior to data collection.

Sample selection

Qualitative inquiry typically focuses in depth on relatively small, purposefully selected samples (Creswell, 1994). Among LHWs attending the training session, 15 LHWs who were actually involved in home visits were included in the study. These LHWs were volunteers, and they regularly worked in coordination with PCPs. Approximately 4-8 LHWs in each tambon visited caregivers and later met with the researcher every three months for group discussions.

Although 12 PCPs from four health centers in Phan Thong District participated in the training only 6 providers who actually provided oral health services were interviewed. The demographic data of the LHWs and PCPs in the study are summarized in Table 1. The main characteristics of caregivers and children in this study are presented in Table 2.

Data collection

During the one-year long intervention, focus group discussions (FGDs) were conducted with LHWs three times at 3-, 6-, and 9-month periods in each tambon. After LHWs visited caregivers, they were asked to fill out a "follow-up form" and bring it to discuss with the researcher. In-depth interviews were also conducted with the one or two PCPs in each health center during the one-year intervention period. One researcher who was trained and had experience conducting focus groups and in-depth interview conducted all of the focus groups and interviews throughout the study. The Thai language was used during the interviews and focus

Table 1
Demographic data of the informants.

Informant	Variable
Primary care providers	
Inclusion criteria	Staff in health centers who implemented the program.
Number of informants	6
Gender	Male = 1, Female = 5
Age	28 to 47 (mean = 33.3 yrs)
Position	Public health officers = 4 Dental nurse = 1 Public health technical officers = 1
Years of work experience	8 to 27 yrs (mean = 14.7 yrs)
Lay health workers	
Inclusion criteria	Village health volunteers who had visited caregivers during the program.
Number of informants	15
Gender	Male = 1, Female = 14
Age	36-55 (mean = 46 yrs)

groups. The researcher also employed participant observation (Ulin *et al*, 2005) to gain an understanding and the meaning of participants' experiences during site visits. Interviews and FGDs were tape-recorded and transcribed.

Data analysis

Text transcriptions from each focus group and interview were analyzed through an iterative coding process by incorporating emergent themes across informants, groups, and times (Creswell, 1994; Ulin *et al*, 2005). In order to assess data saturation, each focus group and interview were analyzed as soon as they were completed, and common themes were compared with the data across groups to find the repeated themes. This analysis process continued until no new themes were produced (Ulin *et al*, 2005). In addition, health center logs and LHWs' follow-up forms were assessed and calculated for attendance of caregivers at health center and percentage of caregivers reached by LHWs in each *tambon*.

RESULTS

Twelve focus groups and 11 in-depth interviews were conducted. The time for FGDs and interviews ranged from 34 to 102 minutes. Table 3 presents the amount and percentage of caregivers who were reached by each program component in the 4 *tambons*.

Barriers among lay health workers (LHWs)

Sixty-four out of 88 households that registered to participate in the program were visited by LHWs. The reasons that LHWs did not reach some caregivers were that the caregivers and children had moved, or were not at home, or were otherwise unlocatable. The analysis indicated that the underlying barriers that related to home visits.

Assumptions about caregivers' knowledge

An important barrier to providing information was the assumption that caregivers already had appropriate oral health knowledge. LHWs believed that most caregivers knew about what snacks

Table 2
The socio-demographic data of the caregivers and children (N=88).

Characteristics	No. (%)
Caregiver's age (yrs)	
< 20	7 (8.0)
21-30	39 (44.3)
31-40	29 (33.0)
41-50	9 (10.2)
≥ 50	4 (4.5)
Range	16 - 63
Mean ± SD	31.57 ± 10.34
Child's age (months)	
6-12	37 (42.0)
13-24	37 (42.0)
25-36	14 (16.0)
Range	6 - 36
Mean ± SD	16.31 ± 8.33
Caregiver's education	
Elementary school or under	34 (38.6)
Junior high school	18 (20.5)
High school	24 (27.3)
Diploma/Bachelor's degree	12 (13.6)
Family's income (THB per month)	
<5,000	21 (23.9)
5,000-9,999	30 (34.1)
10,000-14,999	22 (25.0)
≥15,000	11 (12.5)
Unknown	4 (4.5)

are not healthy. Many LHWs believed that mothers knew about the importance of children's tooth brushing, but they did not brush the child's teeth because they "spoiled their child". As a result, some LHWs were reluctant to give useful information or emphasize oral health care to caregivers when they found that caregivers had unhealthy oral health behaviors.

They don't ask, they know everything, everybody knows but they just spoiled their children. It is like, his mom let him, okay the child doesn't want to brush so don't brush. Lay health workers.

Conflicting beliefs. The LHWs believed that drinking water after bottle-feeding would help clean the child's teeth, but they also found that a doctor had told some mothers that giving water after bottle-feeding is unnecessary. Some LHWs questioned the benefit of fluoride and believed that fluoride supplements would make baby teeth difficult to exfoliate, and cause misalignment of the erupting permanent teeth. However, LHWs perceived that the use of fluoride supplements was the most acceptable and easiest oral health preventive practice for caregivers when compared to controlling snacks, tooth brushing, or not sleeping with a bottle. Some of LHWs were uncertain about the disadvantages of prolonged bottle feeding.

My grandchild had a bottle until 5 years old, his teeth are still good; his mouth doesn't flare. Lay health worker.

Lack of skills. A lack of counseling skills about healthy snacks was found to be a barrier in advising caregivers. Some LHWs were uncertain about *how* to suggest to caregivers about children's healthy snacks. The following are examples of responses from LHWs when asked about how to talk to caregivers regarding the healthy snack habit.

Snack...how to say, it's difficult to say. It's very difficult to tell them not to eat snacks. Lay health workers.

Barriers in providing emotional support were hardly mentioned by LHWs during the focus groups. At the beginning of the study, only one male LHW stated that he did not know the caregivers, and that made him "a stranger to them." After the first home visit, all LHWs stated that they were confident and comfortable to talk to caregivers about children's oral health care.

Table 3
The number and percentage of caregivers who attended health centers and were visited in 4 sub-districts (*tambons*).

<i>Tambon</i>	No. of registered caregivers	No. of caregivers who attended services at health center	%
Health center component			
NT	21	7	33.3
BK	17	14	82.4
NH	26	18	69.2
BN	24	11	45.8
Total	88	50	56.8
Home visit component		No. of caregivers who received home visits	
NT	21	12	57.1
BK	17	16	94.1
NH	26	21	80.8
BN	24	15	62.5
Total	88	64	72.7

NT, Nong Tamluang; BK, Baan Kao; NH, Nong Hong; BN, Bang Nang

Barriers among Primary Care Providers (PCPs)

Time and human resources. PCPs consistently mentioned time constraints as a key barrier to providing oral health education and dental screening. PCPs provided vaccinations once a month and always had many children and caregivers in the waiting area, and they wanted to work as quickly as possible in order to release the children. The lack of staff was confirmed by observations during program implementation and interviews. Although one health center had a dental nurse, she was often occupied by other non-dental work similar to other colleague in the health center during well-baby clinics.

...there are so many children we can't look after them all, it's so crowded when they cry and whine we need to make them flow, and we don't have enough staff. Primary care provider.

When asked why they did not organize the appointments so children would not come at the same time, one provider responded,

If we make an appointment, they won't come on time anyway, it depends on when they can get a ride. Some don't have their own (motor-cycle), they need to wait for their neighbor for a ride. Primary care provider.

System coordination

Difficulty in coordination with the local hospital to obtain fluoride supplements and referring children for dental treatment was also stated as a barrier to program implementation in all health centers. The criteria were unclear when to refer children for dental treatment. Therefore, most PCPs refrained from referring children for some preventive treatments such as fluoride treatment or restorations,

unless they had acute symptoms such as dental pain and swelling.

Another thing is we are not sure if we refer 3-year-old children whether they (hospital) will accept them.

If we refer young children, they might say why do you send them, there are so many dental patients already, why do you keep sending them. Primary care providers.

Lack of ownership

While PCPs believed that they did their best, they perceived that providing preventive oral health services was not their direct responsibility. Many PCPs reported that they relied on LHWs to help carry out the program.

If LHWs didn't come, we sometimes didn't pay attention to give tooth-brushes....

We just do what ever we can do. Primary care providers.

Facilitating factors among LHWs

Social networks. When exploring the reasons why some health centers had more caregiver turnouts for 3-month visits, the focus group data suggested the importance of the LHWs and caregivers being part of their social networks. It was found that if the LHWs were familiar or knew the caregivers, they would remind them of the importance of returning to the health center for a follow-up visit.

The acceptance of caregivers. LHWs mentioned that caregivers were grateful and happy that they visited to support their children's oral health and that encouraged them to visit caregivers. However, many LHWs were uncertain if caregivers would really do as they suggested.

They welcomed and listened to us.

They sit with us well, looked interested.

She said no one had come to me like this, she's never been told about children's teeth.

I think she listened to me and she said she will do it, but I don't know when I turned my back if she did. Lay health workers.

LHW confidence. Many LHWs expressed that the training program increased their knowledge and made them more confident to do the home-visit activities. They had also learned from the group discussions and mentioned that they sometimes used the brochures given to caregivers to help them explain about children's oral health. Overall, most LHWs expressed that they were confident in providing children's oral health support and that facilitated the program implementation.

The sense of importance. All LHWs agreed that visiting caregivers at home was the best way to reach caregivers. The importance of home visits as a main way to reach caregivers for oral health support was perceived by LHWs during the program implementation. The value and outcome expectation of home visits were expressed as follows.

The caregivers will use fluoride supplement if we visit them, we can motivate them.

No one looks after them; they raise a child upon their fate (*Yathakram*). Sometimes they don't have time, even when they have problems they don't want to come.

If we don't visit caregivers, they don't come, sometime we learned about their problems. Lay health workers.

Instrumental support. Giving tooth-brushes or toothpaste to caregivers facilitated the home visit activities, and

LHWs explained that it helped them feel welcomed. They believed that providing instrumental support, such as toothbrushes and fluoride supplements during home visits was very important to promote oral health behaviors.

We need to give them stuff such as fluoride supplements, and tell them so they will be interested. Like kids, I asked them would you like to have a toothbrush, they said yes. They wanted it, and then they pretended to brush their teeth. You have to brush like this and that. Lay health workers.

Facilitating factors among PCPs

The training and discussions during the program were found to be helpful in increasing PCPs' knowledge and skills. Overall, PCPs agreed that the program had increased their understanding and involvement in oral health services. Lay health workers mentioned training as important facilitators in all health centers, but the level of helpfulness were perceived differently among the four health centers.

If it is a scale from 1 to 5, before the program maybe 2, now it is 4. We understand more.

If we don't have LHWs, we can't do the program. Primary care providers.

The PCPs suggested that a policy that was consistent throughout the district would facilitate future program implementation. For example, a policy that all 3-year-old children must be screened for dental caries and referred for dental check-ups and fluoride treatments would be a facilitator. This finding indicates the potential effects between the organizational, and policy levels.

If we had the system for the whole district, they will know that at 3 years old they have to see the dentist.

If we had a clear policy, it wouldn't be problem. Primary care providers.

DISCUSSION

The results of this study add to previous research findings and emphasize the complications when trying to incorporate oral health promotion activities in primary care settings. In addition to the lack of training and knowledge of oral health among primary care providers as previously reported (Lewis *et al*, 2000; Siriphat *et al*, 2001), this study found more complex barriers including lack of ownership, lack of system coordination between organizations, and lack of policy. Similar to the study reported by Lewis *et al* (2000), the PCPs in this study perceived difficulty in making dental referrals. In addition, the resource constraints, including personnel, time, and supporting instruments, were found to be important barriers among the PCPs. Although one of the four health centers in this study had a full-time dental nurse, oral health activities had not been implemented any more frequently than the other sites had.

The oral health program implemented in this study had multiple components that were expected to link and support each other. However, PCPs felt that LHWs were the main people responsible for the oral health program. This problem may relate to the shortage of PCPs in health centers in Thailand. According to a survey by the Thai Ministry of Public Health (Onksirimongkol *et al*, 2008), health centers have an average of 2.9 staff per center. The insufficient human resources in the Thai primary care system limits the ability to provide health prevention and promotion activities that otherwise could be managed at health centers. If the problem of insufficient personnel remains

unsolved, it is likely that a prevention model depending on PCPs will be difficult to sustain. However, the present study findings support the increasing use of LHWs to promote children's oral health in communities.

Despite the shortage of PCPs that may contribute to a lack of attention and responsibility for oral health issues, the process of integrating oral health into primary care should be examined. In this study the PCPs indicated that before the training provided by the (study) project, they hardly had any oral health training. A short period of training may not be enough to foster their ownership of children's oral health. Therefore, this study suggests that dental professionals need to advocate more regarding the problems of early childhood caries to primary care practitioners and the policy to facilitate the integration of oral health services in primary health care is needed.

The results from the 'reach' data, FGDs, and in-depth interviews were triangulated and confirmed the importance of social networks among PCPs, LHWs and caregivers in the community in order to implementing program. Using LHWs to indicate caregivers within their social networks rather than just assigning LHWs to geographical areas might improve the program. Future programs need to evaluate the extent and pattern of community networks in order to maximize the effectiveness and benefit of the multilevel program.

The LHWs' perception that caregivers are knowledgeable about children's oral health should be stressed because this might prevent them from supporting caregivers to perform healthy behaviors. Skills for motivating or evoking change among caregivers need more attention during a training program for LHWs.

Since the group discussions during the program were found helpful in increasing LHWs' confidence, counseling skills could be reinforced by booster sessions.

Focus groups among LHWs also revealed that caregivers were less likely to receive children's oral health care information after they delivered their baby, and they were pleased that LHWs visited them at home. This finding clearly emphasizes the need to increase access to children's oral health education for caregivers. Providing oral health counseling to caregivers at home seems to be an ideal channel to support caregivers since most caregivers had difficulty going to health centers with young children, especially if it required them to go for several visits. Therefore, the value of home visits as an important channel to reach caregivers should be emphasized to LHWs in order to increase the sustainability of the program. The overall health issue could also be integrated when LHWs visit caregivers at home.

The results of this study support a previous study (Wongkongkathep and Yongvanichakorn, 2003) that suggested that more than 50% of primary care units failed to integrate oral health care into antenatal care/well baby clinics, and oral health promotion activities remained the same in primary care units compared to the period before the Thai Universal Health Care Coverage Project initiation. Recently, the Ministry of Public Health announced a policy to develop the *Tambon Health Promotion Hospital* that aims to improve the capacity of the health centers within 10 years, from 2010 to 2019. Although this policy indicates that all primary care units need to have at least one dental nurse, a previous report found that dental nurses were located in only 13% of all primary care units (Onksirimongkol *et al*, 2008). The plan for human resources

development in dental nurses will be needed to urgently respond to this policy. Meanwhile, addressing oral health problems should not be delayed, but should be supported by improving the coordination between district hospitals and health centers, and by increasing the utilization and capacity of lay health workers.

There were some limitations in this study. It is important to note that PCPs in this study may have different characteristics from those previously reported. Most health providers in primary care units in Thailand are public health officers, and their barriers and facilitating factors may be different from those in western countries. While many reports have recently stated the need for integration of oral health preventive services into the primary care setting, the barriers should be addressed in order to effectively plan a long-term program. Although the results of this study indicated the barriers among LHWs to promote children's oral health, their positive attitude and potential to support caregivers should not be overlooked. The findings emphasized the complexity to advocate children's oral health issues by LHWs and PCPs. Further research is needed to examine and identify barriers and facilitating factors in different contexts in order to indicate the direction needed to improve the oral health promotion programs that utilize LHWs and PCPs in the future.

REFERENCES

- Baranowski T, Perry CL, Parcel GS. How individuals, environments, and health behavior interact: Social Cognitive Theory. In: Glanz K, Rimer BK, Lewis FM, eds. Health behavior and health education: theory, research, and practice. San Francisco: Jossey-Bass, 2002: 165-84.
- Beil HA, Rozier RG. Primary health care providers' advice for a dental checkup and dental use in children. *Pediatrics* 2010; 126: e435-41.
- Creswell J. Research design: qualitative and quantitative approaches. Thousand Oaks, CA: Sage, 1994.
- De Grauwe A, Aps J, Martens L. Early childhood caries (ECC): what's in a name? *Eur J Paediatr Dent* 2004; 5: 62-70.
- dela Cruz GG, Rozier RG, Slade G. Dental screening and referral of young children by pediatric primary care providers. *Pediatrics* 2004; 114: e642-52.
- Han HR, Lee H, Kim MT, Kim KB. Tailored lay health worker intervention improves breast cancer screening outcomes in non-adherent Korean-American women. *Health Educ Res* 2009; 24: 318-29.
- Harrison RL, Wong T. An oral health promotion program for an urban minority population of preschool children. *Community Dent Oral Epidemiol* 2003; 31: 392-9.
- Lekswat P, Promchai S. The effectiveness of an oral health promotion program by applying a community empowerment principle in preschool children, in Lumphun, Thailand. Chiang Mai: Intercountry Centre for Oral Health (ICOH), 2007. [Cited 2007 Sep 20]. Available from: URL: <http://icoh.anamai.moph.go.th/eng/>
- Lewis CW, Grossman DC, Domoto PK, Deyo RA. The role of the pediatrician in the oral health of children: a national survey. *Pediatrics* 2000; 106: e84.
- Liebman AK, Juarez PM, Leyva C, Corona A. A pilot program using promotoras de salud to educate farmworker families about the risk from pesticide exposure. *J Agromed* 2007; 12: 33-43.
- Lujan J, Ostwald SK, Ortiz M. Promotora diabetes intervention for Mexican Americans. *Diabetes Educ* 2007; 33: 660-70.
- McLeroy K, Bibeau D, Steckler A, Glanz K. An ecological perspective on health promotion programs. *Health Educ Q* 1988; 15: 351-77.

- Ministry of Interior. Thailand. Amphoe information center. Bangkok: Ministry of Interior, 2007. [Cited 2007 Sep 20]. Available from: URL: <http://www.amphoe.com/menu.php?am=92&pv=8&mid=1>
- Ministry of Public Health. The 6th national oral health survey in Thailand 2006-2007. Nonthaburi: Department of Health, Ministry of Public Health, Thailand, 2008. [Cited 2012 Dec 6]. Available from: URL: <http://www.anamai.ecgates.com/>
- Mock J, McPhee SJ, Nguyen T, et al. Effective lay health worker outreach and media-based education for promoting cervical cancer screening among Vietnamese American women. *Am J Public Health* 2007; 97: 1693-700.
- Onksirimongkol P, Wongkongkabheb S, Methanawin S, Sirivejsuntorn A. Distribution and workload of Thai dental nurses in a primary care unit in 2006. *J Health Syst Res* 2008; 2: 91-8.
- Rhodes SD, Foley KL, Zometa CS, Bloom FR. Lay health advisor interventions among Hispanics/Latinos: a qualitative systematic review. *Am J Prev Med* 2007; 33: 418-27.
- Riter D, Maier R, Grossman DC. Delivering preventive oral health services in pediatric primary care: a case study. *Health Aff (Millwood)* 2008; 27: 1728-32.
- Rozier G, Sutton BK, Bawden JW, Haupt K, Slade GD, King RS. Prevention of early childhood caries in North Carolina medical practices: implications for research and practice. *J Dent Educ* 2003; 67: 876-85.
- Siriphat P, Horowitz A, Child W. Perspectives of Maryland adult and family practice nurse practitioners on oral cancer. *J Public Health Dent* 2001; 61: 145-9.
- Ulin PR, Robinson ET, Tolley EE, ed. Qualitative methods in public health: a field guide for applied research. 1st ed. San Francisco: Jossey-Bass, 2005.
- Vachirarojpisan T, Shinada K, Kawaguchi Y, Laungwechakan P, Somkote T, Detsomboonrat P. Early childhood caries in children aged 6-19 months. *Community Dent Oral Epidemiol* 2004; 32: 133-42.
- Wongkongkathep S, Yongvanichakorn B. Oral health care in contracting units of primary care under Universal Health Care Coverage Project in 2002. *J Health Sci* 2003; 12: 645-58.