

Original Article

Implementing Participatory Intervention on Diabetes Screening in Thai Rural Communities

B. Silaruks,* A. Cheawchanwattana, C. Limwattananon and S. Limwattananon

Faculty of Pharmaceutical Sciences, Khon Kaen University, Khon Kaen, Thailand.

Abstract This study aimed to assess the effect of community participation (CP) on diabetes screening rates and other related factors, compared between the intervention community (IC) and the control community (CC). The CP was conducted over an eighteen-month period. First, primary care workers and local groups identified community needs relating to diabetes screening. Second, educational training and resource mobilizing were performed. Third, community members participated in three negotiation sessions in terms of diabetes screening. Community members aged 36 to 60 years who did not have a diabetes screening during the past three years at baseline were randomly sampled for interviews. There was an improvement in diabetes and benefit coverage knowledge, health attitudes, and screening use in the IC. Diabetes screening rate of total population in the IC increased from 10% to 45% ($p < 0.001$) and the screening rate of those in the CC rose from 10% to 20% ($p = 0.04$). A suitable screening service including a frequently mobile screening unit had been devised from the decisions made by the community members. Health attitudes, the suitable screening service, and community support had an influence on the utilization of diabetes screening. This study demonstrates the effectiveness of the CP intervention in promoting diabetes screening utilization in rural communities. ©All right reserved.

Keywords: community participation, diabetes screening, participatory research, rural community

INTRODUCTION

According to the American Diabetes Association recommendations, the Department of Disease Control (DDC) in Thailand has recommended all Thai adults to screen for diabetes every three years since 2001.^{1,2} Additionally, universal health care coverage policy has emphasized the primary care units (PCU) to provide primary health care (PHC) for people in sub-district level.³ Particularly, preventive approach in PCU can basically improve health gains in rural areas where majority of people live. Despite this recommendation and service availability, the screening rate was only approximately 10% of target persons.⁴ Low diabetes screening rate needs to be addressed and effective health promotion

interventions to increase the rate among the target groups are required.

Community participation (CP), one of the main principles of PHC, was defined as the key strategy to empower people to be able to control their health.⁵⁻⁸ Therefore, CP should be applied to PCU for diabetes screening services to encourage local people to make better use of existing health services. This study primarily aimed to assess the effect of the CP on diabetes screening rate and other related factors, comparing between the intervention community (IC) and the control community (CC). Secondly, we aimed to investigate how community members in the IC progress in terms of screening use and changes in both individual and community level.

*Corresponding author: Faculty of Pharmaceutical Sciences, Khon Kaen University, Khon Kaen 40002, Thailand.
Email: sbenja@kku.ac.th

MATERIALS AND METHODS

Procedures

The quasi-experimental design was used. Two rural communities located in Khon Kaen were randomly sampled as the IC and the CC. There were no significant differences in village size, population density and distance from PCU, between the IC and the CC. The CP was conducted from April 2004 to September 2005 by the methods summarized in Table 1.

Participants for Quantitative Evaluation

In the IC and the CC, people aged 36 to 60 years who did not have a diabetes screening

during the past three years, at the baseline, and lived at least one year were randomly sampled for interviews at the baseline and the 18-month follow-up.

Participants for Qualitative Evaluation

The qualitative data identifying the perceptions of and other related factors of the diabetes screening were collected from three sources: in-depth interviews, focus group interviews, and participant observations. Two focus group interviews (3-5 persons per session) were conducted. The first session comprised the village health volunteers (VHV) and the community leaders (CL). The participants in the second session included only community members.

Table 1. Methods of community participation in the intervention phase

Step 1 Community health needs assessment

At the beginning, the existing local groups (VHV and CL), PCW and researchers met to join to:

- assess local health problems particularly for diabetes
- discuss factors associated with diabetes screening use
- share information on diabetes and opinions about their obstacles on diabetes prevention
- identify and prioritize the community needs
- set the goals consistent with the community needs

Step 2 Community capacity building and resource mobilization

Before the negotiation began:

1. PCW trained all VHV in three two-hour sessions (ranged from 90 to 150 minutes) consisted of:
 - diabetes knowledge
 - diabetes screening service
 - benefit coverage knowledge
2. Health development meetings among local groups, PCW, and researchers were performed. PCW and researcher encouraged the local groups to:
 - develop a plan for diabetes prevention action to accomplish locally determined goals
 - mobilize the resources from either internal or external community sources
 - provide support for people to come to the negotiation such as local broadcasting
 - participate in creating and enhancing diabetes screening services

Step 3 Negotiation and evaluation

Three bimonthly negotiation sessions (two to three hours each) among all local groups and community members were performed. Each negotiation had many activities including:

1. PCW, VHV and local groups described the situation relating to diabetes and its progression to community members
 2. Community members were empowered to
 - express their perceptions, knowledge gaps, and apprehension associated with diabetes
 - clarify the knowledge of health care coverage and misperception related to diabetes
 - share opinions to contribute the diabetes preventive activities
 3. PCW and VHV educated community members on diabetes which contain the components of
 - what diabetes is
 - attributions for diabetes
 - how to detect diabetes
 - simple steps to prevent or delayed diabetes
 4. Each other discussed diabetes screening services and prevention activities
 5. Each other identified the problems during this step, designed how to solve them based on local knowledge, and made decisions together
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Eight key informants were interviewed in-depth. Those key informants included two primary care workers (PCW) from PCU, three VHV, and three community members. For participant observations, the researcher participated in three negotiation sessions as an observer. Each negotiation session consisted of many local groups including PCW, VHV, CL, and community members.

Measurement

The questionnaire consisted of information on socio-demographic characteristics, diabetes knowledge, benefit coverage knowledge, and health attitudes. Health attitudes were assessed toward health personnel, health services, and diabetes screening.

Table 2. Characteristics of participants in the intervention community (IC) and the control community (CC)

Variables	IC (n = 110)	CC (n = 110)	p-Value
Age			0.27
36-40	12 (10.9)	13 (11.8)	
41-45	22 (20.0)	21 (19.1)	
46-50	19 (17.3)	28 (25.5)	
51-55	34 (30.9)	21 (19.1)	
≥ 55	23 (20.9)	27 (24.5)	
Gender: female	69 (62.7)	60 (54.6)	0.22
Marital status: married	107 (97.3)	109 (99.1)	0.31
Education: elementary school or lower	95 (86.4)	98 (89.1)	0.54
Occupation			1.0
Farmers	84 (76.4)	84 (76.4)	
Employees	18 (16.3)	18 (16.3)	
Unemployed	8 (7.3)	8 (7.3)	
Family members			0.59
1-4	57 (51.8)	53 (48.2)	
5 or more	53 (48.2)	57 (51.8)	
Having family history of diabetes	34 (30.9)	30 (27.3)	
Annual household income			0.33
< 30,000 baht	65 (59.1)	72 (65.5)	
More than 30,000 baht	45 (40.9)	38 (34.5)	
Population density area			0.41
High	48 (43.6)	42 (38.2)	
Low	62 (56.4)	68 (61.8)	
Having co-morbid diseases	21 (19.1)	11 (10.0)	0.06
Body mass index (BMI)			0.37
< 25	68 (61.8)	73 (66.4)	
25 ≤ BMI < 30	29 (26.4)	30 (27.3)	
≥ 30	13 (11.8)	7 (6.4)	
Smoking status			0.29
Nonsmoker	77 (70.0)	77 (70.0)	
Ex-smoker	14 (12.7)	7 (6.4)	
Light smoker	14 (12.7)	17 (15.4)	
Heavy smoker	5 (4.6)	9 (8.2)	
Physical activity			0.36
Inactive	31 (28.2)	39 (35.4)	
Moderate exercise	28 (25.4)	30 (27.3)	
Active exercise	51 (46.4)	41 (37.3)	
Alcohol consumption			0.08
No drink	47 (42.7)	48 (43.6)	
Light drinking	38 (34.6)	49 (44.6)	
Heavy drinking	25 (22.7)	13 (11.8)	
Diabetes screening status			0.003
Ever had	82 (74.5)	61 (55.5)	
Never had	28 (25.5)	49 (44.5)	

Data Analysis

The quantitative data were analyzed by using the *t*-test or the chi-square test. A logistic regression analysis was carried out to examine the effect of the CP intervention on diabetes screening. The analysis was conducted by using the statistical package STATA 7.0. The qualitative data were transcribed, coded, and analyzed by using the methodological triangulation.

RESULTS

Quantitative Results

Socio-demographic characteristics of each 110 participants in the IC and the CC are shown in Table 2. There was a significant difference in diabetes screening status between the IC and the CC. Participants in the IC were most likely to take diabetes screening.

The mean scores of knowledge and attitudes at the baseline and 18-month follow-up were illustrated in Table 3. Among the participants in the IC, the mean scores of knowledge and attitudes increased significantly, except score of attitude toward diabetes screening. There was a significant knowledge gain of diabetes knowledge among those in the CC. All health attitudes and benefit coverage knowledge at the baseline and 18-month follow-up were almost the same.

The percentages of the participants who had knowledge and positive attitudes, between the IC and the CC are presented in Table 4.

The percentage of having diabetes knowledge among those in the IC was significantly higher than that of those in the CC (45% vs. 28%). In the IC, the participants with positive attitude toward diabetes screening were more than those in the CC (64% vs. 47%). There were no significant differences in the percentage of having benefit coverage knowledge and having positive attitudes toward health personnel and services, between the IC and the CC.

The associations between all variables and diabetes screening use were analyzed by multivariate logistic regression, as presented in Table 5. After controlling all other variables, the CP intervention was significantly associated with the utilization of diabetes screening. The participants who lived in the IC were more likely to have diabetes screening approximately three times when compared with those who lived in the CC (OR = 2.96, 95% CI, 1.25-7.01). Other independent variables included age, gender, attitudes toward diabetes screening and health personnel, body mass index (BMI), alcohol consumption, and physical activity.

The diabetes screening rates at the baseline and the 18-month follow-up among the IC and the CC are presented in Figure 1. The screening rate in the IC increased substantially from 10.5% before the intervention to 44.8% after the intervention. An increase in the rate of diabetes screening use in the CC rising from 10.4% to 20.4% was less than the increase in the IC.

Table 3. Changes in the mean scores of knowledge and attitudes between the intervention community (IC) and the control community (CC)

Variables	Intervention community (n = 20)			Control community (n = 19)		
	At baseline	18-month follow-up	<i>p</i> value	At baseline	18-month follow-up	<i>p</i> value
Diabetes knowledge ^a	4.3 ± 3.3	6.9 ± 4.3	0.03	3.2 ± 3.1	6.2 ± 4.1	0.007
Benefit coverage knowledge ^b	1.7 ± 0.8	3.3 ± 0.7	< 0.001	1.3 ± 1.1	1.9 ± 1.3	0.21
Attitude toward diabetes screening ^c	3.8 ± 0.5	3.9 ± 0.7	0.86	3.7 ± 0.4	3.6 ± 0.5	0.35
Attitude toward health personnel ^c	3.9 ± 0.5	4.4 ± 0.6	0.001	4.3 ± 0.7	4.4 ± 0.6	0.67
Attitude toward health services ^c	3.9 ± 0.5	4.4 ± 0.5	< 0.001	4.2 ± 0.7	4.3 ± 0.5	0.49

^a Possible score range from 0 to 10.

^b Possible score range from 0 to 4.

^c Scale 1-5: 1-more negative to 5-more positive.

Table 4. Knowledge and attitudes among the participants between the intervention community (IC) and the control community (CC)

Variables	IC (n = 110)	CC (n = 110)	p-Value
Knowledge of diabetes ^a			0.01
Having knowledge	49 (44.6)	31 (28.2)	
Lack of knowledge	61 (55.4)	79 (71.8)	
Knowledge of benefit coverage ^b			0.19
Having knowledge	40 (36.4)	31 (28.2)	
Lack of knowledge	70 (63.6)	79 (71.8)	
Attitudes toward diabetes screening ^c			0.01
Positive attitudes	70 (63.6)	52 (47.3)	
Neutral or negative attitudes	40 (36.4)	58 (52.7)	
Attitudes toward health personnel ^c			0.49
Positive attitudes	62 (56.4)	67 (60.9)	
Neutral or negative attitudes	48 (43.6)	43 (39.1)	
Attitudes toward health services ^c			0.48
Positive attitudes	75 (68.2)	70 (63.6)	
Neutral or negative attitudes	35 (31.8)	40 (36.4)	

^a Possible score range from 0 to 10, with score ≥ 9 representing having knowledge of diabetes.

^b Possible score range from 0 to 4, with score = 4 representing having knowledge of benefit coverage.

^c Scale 1-5: 1-more negative to 5-more positive, with score ≥ 4 representing having positive attitudes.

Qualitative Results

Three key themes related to diabetes screening utilization emerged from the data collected from the triangulation approach. These themes included community's perception of diabetes screening, diabetes screening provision, and community supports associated with diabetes screening. First, community members were mostly identified that knowledge, belief, values, and attitudes may predispose to obtain or avoid the diabetes screening test. Second, some problems that participants mentioned were related to the delivery system of screening service. Most participants suggested that they were more convenient if the services were provided more frequently and the mobile screening unit should be set at their villages. Finally, several participants stated that community and family supports, particularly from their spouse, were the strongest reinforcement for taking the diabetes screening.

DISCUSSION

This study demonstrates the effectiveness of the CP intervention in promoting the utilization of diabetes screening. There was an improvement in diabetes and benefit

coverage knowledge, and health attitudes. Moreover, the CP intervention could empower and encourage people to make better use of existing diabetes screening service by providing suitable screening services and community supports.

The community members in the IC raised the problems of lack of transportation. Thus, PCW and the CL provided mobile service which was more convenient for rural lifestyle. Consistent with previous studies, community members perceived more valuable and responsible for community health development when the provision of services, based on the rural lifestyle, was created by themselves.⁹⁻¹² This findings show that community participation could add more beneficial in health promotion than the usual services.

The other important factors associated with diabetes screening use were physical activity and population density area. Participants who lived in the high population density area may have opportunity to communicate to other people and to participate in community activities in their area. Similarly, those who had physical activities seemed to be able to involve in other activities. It would be easier

Table 5. Logistic regression for the utilization of diabetes screening (n = 220)

Variables	Odds ratio	95% CI
Intervention community (vs. control community)	2.96**	1.25-7.01
Predisposing factors		
Age group (years)		
36-40	2.35	0.57-9.62
41-45 (reference group)		
46-50	1.13	0.32-3.95
51-55	1.88	0.55-6.44
56-60	4.12*	1.10-15.38
Male	0.18**	0.05-0.62
Married	5.18	0.18-152.17
Low education	2.46	0.66-9.20
Large family size	1.16	0.52-2.58
Family history of diabetes	1.03	0.45-2.36
Having more knowledge of diabetes	1.30	0.52-3.24
Positive attitudes toward diabetes screening	2.57*	1.15-5.71
Positive attitudes toward health personnel	3.76*	1.23-11.47
Positive attitudes toward health service	0.36	0.12-1.12
Personal health practices		
BMI group		
< 25 (reference)		
25 ≤ BMI < 30	3.64**	1.40-9.44
BMI ≥ 30	1.14	0.28-4.52
Cigarette smoking		
Non-smoker (reference)		
Ex-smoker	3.21	0.58-17.86
Light smoker	4.11	0.94-18.04
Heavy smoker	3.80	0.62-23.18
Alcohol drinking		
No drink (reference)		
Light	1.21	0.45-2.78
Heavy	0.19*	0.05-0.72
Physical activity		
Inactive (reference)		
Moderate exercise	4.02**	1.41-11.50
Active exercise	5.03***	1.88-13.44
Enabling factors		
Employed	0.47	0.08-2.61
Low HH income (< \$10000/yr)	0.76	0.30-1.95
Having more knowledge of benefit coverage	1.02	0.40-2.55
High population density area	3.90**	1.61-9.42
Needs factors		
Having co-morbid diseases	1.21	0.41-3.62

* $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$

to encourage community members to involve in health development program if a CP was implemented in the crowded area where accessibility was not problematic.⁸

This study had several limitations. Health care services in the IC and the CC were provided by the same PCU and the contamination of the PCW seemed to occur.

However, the commitment between the researchers and the PCW to implement the CP with ethical agreements was provided before the study began. Because of the time constraint, the study does not address other impacts of the CP on other risk behavior, such as physical activity and healthy diet. Future studies should aim to assess the effect of the community participation on these risk

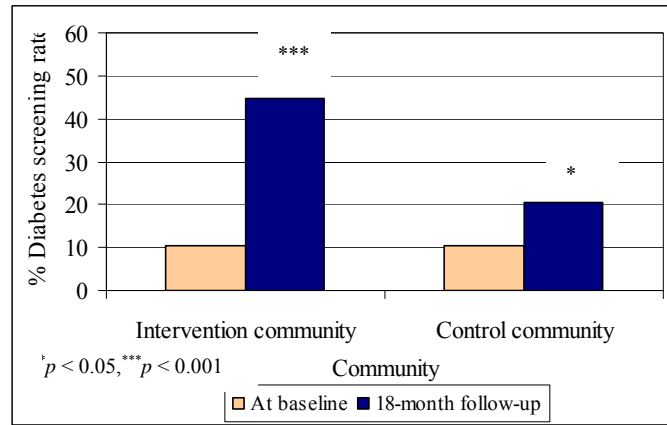


Figure 1. Diabetes screening rate in each community at baseline and 18-month follow-up.

factors because the issue would be more beneficial in the diabetes prevention program.

CONCLUSION

The findings in this study show that community participation intervention could promote the utilization of diabetes screening effectively. Future research should be a large scale intervention using community participation aiming to affect several health promotion aspects on diabetes.

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