Pakistan Journal of Social Sciences 9 (4): 161-166, 2012
ISSN: 1683-8831

Effects of Multi Activity Intervention on Health Behaviors among Middle-Aged Adults in Rural Communities in Ubon Ratchathani Province, Thailand

[1]Nipon Manasathitpong, [1]Somjit Supannatas, [2]Saksit Tridech and [1]Frank-Peter Schelp
[1]Faculty of Public Health, Mahasarakharm University, Mahasarakharm Province, Thailand
[2]Ministry of Natural Resources and Environment, Bangkok, Thailand

Abstract: A pre-survey among the middle-aged adults in Ubon Ratchathani province conducted by the researcher indicated high prevalence of physical inactivity, dietary fat intake and cigarette smoking. These unhealthy behaviors are risk factors of cardiovascular diseases which are leading causes of mortality in the province. This action research aimed to develop a so-called Multi Activity Intervention (MAI) for changing those three unhealthy behaviors among middle-aged adults in rural communities and evaluate its effects and impacts. The MAI consisted of five major activities: participatory learning, home visit, individual counseling, group meeting and incentive giving. Two communities were purposively assigned as an intervention group (n = 198) and a comparison group (n = 200). Participants were middle-aged adults of 40-59 years. Data were collected by using interview questionnaires at baseline, 3 and 6 months after participatory learning. Statistical analyses employed descriptive statistics, χ^2-test, independent samples t-test and paired t-test. The results revealed that the MAI relatively increased leisure time-related physical activity ($p<0.05$) decreased dietary fat intake ($p<0.05$), increased stage of change scores for physical activity and for dietary fat reduction ($p<0.05$). It inspired 6 out of 11 smokers quit. It had no impact on general health status, body mass index and waist circumference. However, it relatively reduced mean total cholesterol level ($p<0.05$) by 5.14% and mean fasting blood sugar level by 4.28%. The MAI is effective and could be applied to other age group for changing unhealthy behaviors.

Key words: Multi-activity intervention, health behavior, middle-aged adult, rural community, Thailand

INTRODUCTION

Non-communicable diseases contribute to 60% of deaths and 43% of disease burden in 2001 and will increase to 73% of all deaths and 68% of global burden of disease by 2020 (Bureau of Policy and Strategy, Ministry of Public Health, 2005). Most of non-communicable diseases could be prevented by promoting lifestyle modification such as increasing physical activity, reducing dietary fat intake and quit smoking (Glanz and Oldenburg, 1997). In Ubon Ratchathani province, cardiovascular disease is the first leading cause of mortality with a specific mortality rate of 47.08 per 100,000 populations.

The group with the highest increase in obesity is in the age of 40-49 years old. Obesity in this group increased from 19.1-40.2% during the past 10 years. Middle-aged adults of 40-59 years without diabetes or hypertension are 20% overweight and 4% of them are obese. It is estimated that about 6-7 million people in Thailand are at risk for cardiovascular-related diseases. The national health behavior surveillance report revealed that 57.1% of people aged 20-60 years perform physical activity and also 46.7% of elderly do so. Most common physical activities among elderly are walking (40.9%), jogging (6.0%) and bicycling (4.3%).

The researcher conducted a cross-sectional pre-survey among 1,200 middle-age adults in Ubon Ratchathani Province, Thailand. The results revealed that 46% of them perform leisure time-related physical activity. It also revealed that 72.2% of them always intake dietary fat. The prevalence of smoking was 15.1% for regularly smoke and 7.3% for occasionally smoke. They smoke 10 cigarettes per day in average. The personal factors affecting physical inactivity are lack of knowledge about proper exercise, lack of awareness and lack of motivation. People prefer performing group physical exercise. They need a facilitator to lead physical exercise performance.

Regarding unhealthy dietary intake, they consider only the taste of food not the negative outcome of the habit. Fatty food is commonly consumed. Knowledge about proper nutrition is lacking. Smoking is a tradition

Corresponding Author: Nipon Manasathitpong, Faculty of Public Health, Mahasarakharm University, Mahasarakharm Province, Thailand

among men. Family members and peer groups influence smoking habits. Regarding waist circumference consideration, 44.60% of them were at risk. Regarding total cholesterol consideration, 6.67% of them were risky while 3.39% were at high risk. Regarding waist circumference consideration, 44.60% of them were at risk. Regarding total cholesterol consideration, 6.67% of them were risky while 3.39% were at high risk. Regarding fasting blood sugar, 6.58% of them were pre-diabetes while 8.50% were diabetes. This research aimed to develop a so-called multi activity intervention and evaluate its effects on physical activity, dietary fat intake, smoking and general health status. It also aimed to evaluate the impacts on body mass index, waist circumference, total cholesterol level and fasting blood sugar level among middle-aged adults (40-59 years) in rural communities of Ubon Ratchathani Province, Thailand.

MATERIALS AND METHODS

Two rural communities were purposively selected and assigned. An intervention group consisted of 198 middle-aged adults and a comparison group consisted of 200 middle-aged adults. The researcher formulated the Multi Activity Intervention (MAI) after reviewing literatures. The researcher had reviewed literature and consulted the experts before trying out the instruments. The instruments used for collecting data were interview forms, Glucose Cholesterol Triglyceride portable meter and anthropometric measurement equipments. The interview forms consisted of 6 parts: socio-demographic characteristics, anthropometric measurement and blood test results, physical activity, dietary fat intake, cigarette smoking and general health status. Major activities in the MAI were 2 days participatory learning, home visit, individual counseling, group meeting and incentive. Baseline data were collected prior to the 2 days participatory learning activity. The participants were classified into different groups according to their stages of change: pre-contemplation, contemplation, preparation, action and maintenance. Different stages matched activities were applied in each group. Sub-district health personnel performed once home visit after the participatory learning activity. The home visitors hold a group meeting in the community gave individual counseling and admiring certificate to whom who sustain healthy behaviors as an incentive during home visitation. Post data were collected at 3 and 6 months after the baseline. The study flow diagram is shown in Fig. 1. χ^2-test was employed to determine the differences of distribution of stages of change between the two groups

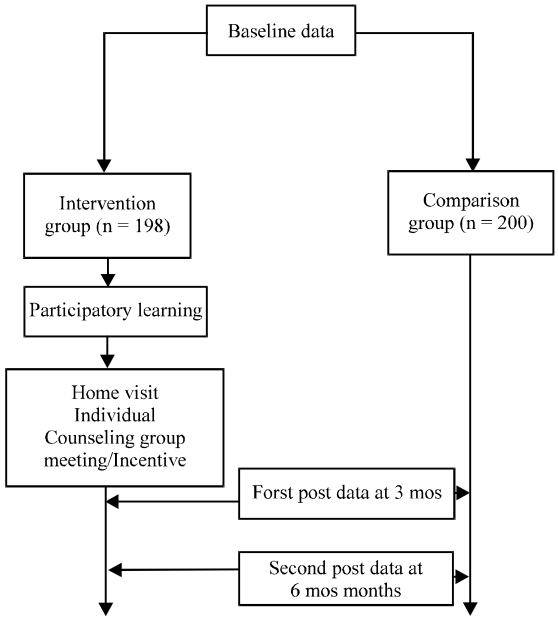

Fig. 1: Study flow diagram

at baseline. Independent samples t-test was employed to compare the mean differences of dependent variables between the two groups. Paired t-test was employed to compare the differences of means of the outcome and the impact variables within the intervention group.

RESULTS AND DISCUSSION

Most of the participants in the intervention group are farmers (89.00%) and low educated (82.85% for primary educational level). Thus, it was difficult for them to complete the assigned daily record forms of physical activity and food intake. The participants were the residents of the target communities and the sample size was adjusted for anticipated response rate, thus drop off rate did not violate the sample size. There were no differences in the distributions of gender, age group, marital status, educational level and occupation between the two groups as shown in Table 1. According to Asawachaisuwikrom (2006) of the personal factors only income had a significant direct effect on physical activity. The results of the research revealed that both two groups have the same amount of monthly income. Thus, socio-demographic characteristics are not confounding factors that might affect the results of this research.

Change in health behaviors: Regarding stages of change, there was a significant increase in mean score of stage of change for physical activity as well as dietary fat reduction at 3 and 6 months in the intervention group

Table 1: Socio-demographic characteristics at baseline

Variables	Intervention group no. (%)	Comparison group no. (%)	χ^2	df	p-value
Gender	-	-	0.262	1	0.609
Male	88 (44.40)	94 (47.00)	-	-	-
Female	110 (55.60)	106 (53.00)	-	-	-
Age group (years)			5.300	3	0.151
40-44	46 (23.20)	41 (20.50)	-	-	-
45-49	49 (24.70)	36 (18.00)	-	-	-
50-54	58 (29.30)	60 (30.00)	-	-	-
55-59	45 (22.70)	63 (31.50)	-	-	-
Marital status	-	-	6.576	3	0.087
Single	2 (1.00)	10 (5.00)	-	-	-
Couple	181 (91.50)	180 (90.00)	-	-	-
Separated/Divorced	15 (7.50)	10 (5.00)	-	-	-
Educational level	-	-	0.136	3	0.987
Primary school	164 (82.80)	163 (81.50)	-	-	-
Secondary school	30 (15.20)	33 (16.50)	-	-	-
College and higher	4 (2.00)	4 (2.00)	-	-	-
Occupation	-	-	0.353	3	0.431
Farmer	176 (89.00)	170 (85.00)	-	-	-
Merchant	9 (4.50)	12 (6.00)	-	-	-
Civil servant	8 (4.00)	10 (5.00)	-	-	-
Others	5 (2.50)	8 (4.00)	-	-	-
Median monthly income (Baht)	3,000	3,000	-	-	-

Table 2: Comparison of mean differences of stage of change scores between the intervention and the comparison groups

	Intervention group		Comparison group				
Variables	N	Mean±SD	N	Mean±SD	t-value	df	p-value
SOC score for PA							
M3-baseline	190	0.81±1.37	194	0.15±1.92	3.380	349	0.000*
M6-M3	147	-0.09±1.59	188	0.15±1.56	-1.373	333	0.085
M6-baseline	148	0.74±1.86	189	0.28±1.79	2.341	335	0.010*
SOC score for DFR							
M3-baseline	191	0.70±1.25	191	-0.32±1.88	6.219	330	0.000*
M6-M3	171	0.05±1.15	186	0.65±1.21	-4.383	355	0.000*
M6-baseline	172	0.69±1.62	190	0.39±2.02	1.519	355	0.065
SOC score for SC							
M3-baseline	11	0.64±1.03	44	0.09±0.88	1.772	53	0.041*
M6-M3	11	-0.55±0.82	45	-0.11±0.75	-1.700	54	0.048*
M6-baseline	12	0.08±1.08	45	0.15±0.98	0.257	55	0.399

*Significant difference

compared to the comparison group ($p<0.05$). Mean score of stage of change for smoking cessation significantly increased compared to the comparison group ($p<0.05$) as showed in Table 2. The results consistent with Spencer *et al.* (2006) who suggested that stage-matched interventions lead to forward stage progression and/increased exercise behavior. The intervention that did not produce higher exercise level among pre-contemplators or contemplators but did lead them into preparation can be considered successful.

Regarding the distribution of stages of change for physical activity and that for dietary fat reduction, the proportions of participants in the action and maintenance stages significantly increased at 3 and 6 months ($p<0.05$) as shown in Table 3. These results supported the positive effects of the MAI. Regarding the distribution of stage of change for smoking cessation, there were no differences in the proportions of participants between the two stages as shown in Table 3. The results did not go along with Nakamura *et al.* (2004) who suggest that stage-matched individual counseling, based on the stage of change model is effective in smokers with the lower motivation to quit as well as those ready to quit. This might be because of too small sample size (11 smokers) of the intervention group.

The stage of change for physical activity was not only the predictive variable but also the outcome variable. However, the proportion of participants in lower stages that shifted to the higher stages (action and maintenance stages) increased for both physical activity and dietary fat reduction in the intervention group. The results in Table 4 showed that the MAI relatively increased leisure time-related physical activity in terms of frequencies per week and amount of minutes per week scores ($p<0.05$). It also relatively reduced frequencies of dietary fat intake in terms of times per week scores but it could not reduce the mean amount of cigarettes smoked per day ($p<0.05$). However, it was found that 6 out of 11 smokers quitted smoking. Regarding general health status, it could not reduce mean general health score among the participants.

Table 3: Comparison of distributions of stages of change at baseline, 3 and 6 months between the intervention and the comparison groups

	Intervention group			Comparison group			Stages of change		
Stages of change	Baseline (%)	Month 3 (%)	Month 6 (%)	Baseline (%)	Month 3 (%)	Month 6 (%)	Baseline	Month 3	Month 6
For physical activity							**Between group (action/maintenance)**		
Pre-action stage	58.08	13.33	18.92	56.50	56.19	49.74	$\chi^2 = 0.102$	$\chi^2 = 80.430$	$\chi^2 = 34.129$
Action/Maintenance	41.92	86.67	81.08	43.50	43.81	50.26	df = 1	df = 1	df = 1
Total	100.00	100.00	100.00	100.00	100.00	100.00	p = 0.750	p = 0.000*	p = 0.000*
For dietary fat reduction							**Between group (action/maintenance)**		
Pre-action stage	54.04	23.86	29.65	51.50	61.78	49.47	$\chi^2 = 0.258$	$\chi^2 = 53.782$	$\chi^2 = 14.773$
Action/Maintenance	45.96	76.14	70.35	48.50	38.22	50.53	df = 1	df = 1	df = 1
Total	100.00	100.00	100.00	100.00	100.00	100.00	p = 0.612	p = 0.000*	p = 0.000*
For smoking cessation							**Between group (action/maintenance)**		
Pre-action stage	94.74	90.90	92.31	96.08	97.78	91.67	$\chi^2 = 0.061$	$\chi^2 = 1.211$	$\chi^2 = 0.066$
Action/Maintenance	5.26	9.10	7.69	3.92	3.22	8.33	df = 1	df = 1	df = 1
Total	100.00	100.00	100.00	100.00	100.00	100.00	p = 0.805	p = 0.271	p = 0.940

*Significant difference

Table 4: Comparison of changes in physical activity scores, dietary fat intake scores, general health scores and cigarettes smoked per day between the two groups

	Intervention group		Comparison group				
Variables	N	Mean±SD	N	Mean±SD	t-value	df	p-value
PA score (times/week)							
M3-baseline	192	12.14±17.00	195	7.44±15.91	2.808	385	0.002*
M6-M3	172	2.44±9.730	194	2.73±10.54	-0.272	364	0.382
M6-baseline	173	15.55±17.13	194	10.26±14.98	3.313	344	0.001*
PA score (min/week)							
M3-baseline	192	13.59±17.96	195	4.98±18.70	4.623	385	0.000*
M6-M3	172	4.00±10.60	194	-0.52±11.37	0.447	364	0.327
M6-baseline	173	14.39±18.93	194	4.59±17.66	5.131	365	0.000*
DFI score							
M3-baseline	190	-30.42±30.91	195	14.87±29.33	-14.742	380	0.000*
M6-M3	170	2.35±26.00	195	-2.77±22.30	2.026	363	0.022*
M6-baseline	173	-26.94±30.08	195	12.10±29.93	-12.457	366	0.000*
Cig smoked per day							
M3-baseline	11	-4.36±10.92	44	-3.43±7.060	-0.348	53	0.364
M6-M3	11	3.55±4.930	45	1.33±3.860	-1.612	54	0.056
M6-baseline	12	-7.42±10.52	45	-4.51±7.400	-1.101	55	0.138
General health score							
M3-baseline	186	-1.23±3.820	173	-0.71±2.560	-1.526	325	0.064
M6-M3	168	0.35±4.770	172	0.45±1.520	-0.298	204	0.383
M6-baseline	172	-0.67±5.960	192	-0.32±2.660	-0.701	231	0.242

The research compared the relatively aggregated change of the outcome and impact variables. The measured variables were the scores not the exact amount. However, the results could determine levels of physical activity and dietary fat intake, not exact frequency and amount of min/week of physical activity or exact frequency of dietary fat intake. The physical activity scores at 3 and 6 months remained significantly higher than those at baseline. This might be because of the effect of home visitation.

Even there were no quantitative evidence to support this assumption, home visitation play a role of key success factor in previous health promoting programs in Thailand such as family planning program, expanded program on immunization and nutrition program. These findings are relevant to Gary Moorhead's study which found that concurrent of classes and exercise counseling with monthly group meeting was most successful.

According to stage of change model by Prochaska and Di Clemente (1983), Prochaska *et al.* (1992) and Prochaska and Velicer (1997) and participatory learning concept can be applied to develop the MAI for changing the three unhealthy behaviors among middle-aged adults. The stage of change can be evaluated as an outcome variable. The focus of this MAI was primarily on changing individuals behaviors as a method for reducing the population risk of cardiovascular disease. As a result, the target of change are the middle-aged population but the population change is defined as an aggregate of individual changes which can be measured in terms of mean differences of the outcome or impact variables before and after the intervention.

Change in the impact variables: Regarding to the impact variables, the intervention had an effect on reducing mean total cholesterol level and mean fasting blood sugar level

Table 5: Comparison of changes in means of body mass index, waist circumference, total cholesterol level and fasting blood sugar level among the two groups

Characteristics	n	Mean difference	SD	t-value	df	p-value
Body mass index						
Intervention group	178	0.09	1.66	0.293	370	0.384
Comparison group	194	0.03	1.72	-	-	-
Waist circumference						
Intervention group	178	0.43	4.08	0.852	365	0.197
Comparison group	189	0.07	4.04	-	-	-
Total cholesterol						
Intervention group	177	9.50	29.94	4.586	369	0.000*
Comparison group	194	-7.18	39.03	-	-	-
Fasting blood sugar						
Intervention group	173	4.11	24.69	1.822	366	0.035*
Comparison group	195	-0.68	25.61	-	-	-

*Significant difference

Table 6: Means of each variable in the intervention group

	Mean			Increase (%)		
Variables	Baseline (a)	3 Mo. (b)	6 Mo. (c)	Average	(b)-(a)	(c)-(a)
Physical activity score						
Times/week	31.77	43.70	46.360	37.55	45.920	41.73
Min/week	27.12	40.63	40.320	49.82	48.670	49.24
Dietary fat intake score	83.87	56.95	61.040	-26.42	-26.780	-26.60
SOC for physical activity score	3.37	4.18	4.110	24.04	21.960	23.00
SOC for dietary fat reduction	3.39	4.08	4.090	20.35	20.650	20.50
Score	172.72	-	-	-	-5.140	-
Total cholesterol level	163.84	-	-	-	-4.280	-
Fasting blood sugar level	96.23	-	92.120	-	-	-

($p<0.05$) but had no impact on body mass index and waist circumference as shown in Table 5. The results suggested that more intensity of physical activity and less dietary fat intake are needed for weight loss. Table 6 showed that the MAI could increase leisure time-related physical activity in terms of times/week 41.73%, min/week by 49.24%, stage of change score for physical activity by 23%. It could also reduce the dietary fat intake by 26.60% and stage of change score for dietary fat reduction by 25.50%. Regarding the impact variables the intervention could reduce mean totalb cholesterol level by 5.14% and mean fasting blood sugar level by 4.28%. According to Oberman *et al*. (1994) for every 1% decrease in serum cholesterol level then is an associated 2% reduction in coronary heart disease rate in the population. Thus, the intervention should have an impact on the coronary heart disease rate if expanded in the whole population.

CONCLUSION

According to the results and discussions, the research concluded that the MAI which consisted of participatory learning, home visit, individual counseling, group meeting and incentive giving could increase mean scores of stages change for physical activity and for dietary fat reduction. It could increase leisure time-related physical activity and reduce frequency of dietary fat intake among middle-aged adults. It had an effect on smoking cessation. Even it could not reduce mean body mass index and mean waist circumference but it could reduce mean total cholesterol level and mean fasting blood sugar level. Thus, it is effective and could be applied to other age group for changing those three unhealthy behaviors.

ACKNOWLEDGEMENTS

This research was supported by staffs of Ubonratchathani Provincial Public Health Office. Researcher would like to express his sincere thanks to them and the participants. Researcher also would like to thank those whom are not mentioned for their kind cooperation.

REFERENCES

Asawachaisuwikrom, W., 2006. Physical activity and its predictor among older thai adults. J. Sci. Technol. Humanity, 15: 110-120.

Bureau of Policy and Strategy, Ministry of Pubic Health, 2005. Health policy in Thailand 2005. Chapter 1: Health Policy. http://bps.ops.moph.go.th/webenglish/HealthPolicy5.pdf.

Glanz, K. and B. Oldenburg, 1997. Relevance of Health Behaviour Research to Health Promotion and Health Education. In: Handbook of Health Behavior Research IV: Relevant for Professionals and Issues for the Future. Gochman, D.S. (Ed.). Plenum Press, New York, pp: 152-153.

Nakamura, M., S. Masui, A. Oshima, A. Okayama, H. Ueshima and The HISLIM Research Group, 2004. Effects of stage-matched repeated individual counseling on smoking cessation. Environ. Health Preventive Med., 9: 152-160.

Oberman, A., L.H. Kuller and R.A. Carleton, 1994. Prevention of cardiovascular disease-opportunity for progress. Prev. Med., 23: 727-732.

Prochaska, J.O. and C.C. Di Clemente, 1983. Stage and processes of self-change of smoking: Toward an integrative model of change. J. Consult. Clin. Psychol., 51: 390-395.

Prochaska, J.O. and W.F. Velicer, 1997. The transtheoretical model of health behavior change. Am. J. Health Promot., 12: 38-48.

Prochaska, J.O., C. Di Clemente and J.C. Norcross, 1992. In search of how people change: Applications to addictive behavior. Am. Psychol., 9: 1102-1114.

Spencer, L., T.B. Adams, S. Malone, L. Roy and E. Yost, 2006. Applying the transtheoretical model to exercise: A systematic and comprehensive review of the literature. Health Promotion Practice, 7: 428-443.