

DO INTERVENTION STRATEGIES OF WOMEN HEALTHY HEART PROJECT (WHHP) IMPACT ON DIFFERENTLY ON WORKING AND HOUSEWIVES?

Masoumeh Sadeghi⁽¹⁾, Pejman Aghdak⁽²⁾, Neda Motamedi⁽³⁾, Aliakbar Tavassoli⁽⁴⁾,
Roya Kelishadi⁽⁵⁾, Nizal Sarrafzadegan⁽⁶⁾

Abstract

BACKGROUND: The purpose of this study is to evaluate the possible difference of the impact of Women Healthy Heart Project on lifestyle, as well as physical/biochemical parameters of working women and housewives.

METHODS: This was a community-based intervention study conducted over 5 years (2002-2007) in the counties of Isfahan and Najafabad (intervention areas) and Arak (control). Pre-study situation analysis of women was followed by 5 years of wide-ranging interventions (educational/environmental) conducted by various organizations using different methodologies. The interventions were aimed at modifying/improving lifestyle by increasing physical activity, encouraging healthy eating, and tobacco use cessation. The organizations involved in performing the interventions included the local radio and television authority, health/treatment centers, the Red Crescent Society, Municipalities, the Relief Committee, the Center for Retirees' Welfare, and the Literacy Campaign Organization. After 5 years, final phase same as first phase was planned. The subjects studied in all phases` the pre- and post-intervention phases consisted of 10586 women aged above 18 years. Demographic data, obesity index, smoking, physical activity and eating habit were assessed before and after the study. Data were analyzed using SPSS-15 using Student's t-test, chi-square test, the general linear model of ANOVA, and logistic regression.

RESULTS: We studied 10586 women (6105 and 4481 women, pre- and post-intervention, respectively). Mean age of working women was 34.14 ± 10.09 and 34.08 ± 9.35 years before and after the study, respectively. Mean age of housewives before and after the study was 40.05 ± 14.61 and 40.36 ± 15.32 years, respectively. Interventions conducted during 5 years improved eating habits and decreased tobacco use in working women and housewives. In every phase of the study, there was a significant age difference between housewives and working women ($P < 0.001$). Hence data were adjusted according to age in each phase. Overall physical activity of housewives and working women increased, but the percentage of passive smokers among housewives remained unchanged. Waist circumference and waist-to-hip ratio changed significantly in housewives following interventions ($P < 0.001$). The parameter which improved significantly in working women was waist circumference ($P < 0.05$). However, after adjusting for age, no significant difference was seen between working women and housewives following interventions.

CONCLUSION: Community-based interventions, especially those directed at housewives, can lead to significant improvements in lifestyle and cardiovascular risk reduction. It seems that working women require tailored interventions to suit their conditions. Although short-term outcomes may seem insignificant, persistence and continuity of lifestyle changes may lead to reduced prevalence of cardiovascular diseases. Then longer-term studies are warranted.

Keywords: Women, housewives, working, risk factors, lifestyle modification.

ARYA Atherosclerosis Journal 2011, 6(4):131-137

Date of submission: 20 Jun 2010, *Date of acceptance:* 12 Oct 2010

Introduction

Towards midlife, women are exposed to multiple cardiovascular risk factors, including lipid disorders,

hypertension, obesity, tobacco use, diabetes mellitus and sedentary life style.¹ Despite advances in diagnosis and treatment of obstetric and

1- MD, Associated Professor of Cardiology, Isfahan Cardiovascular Research Center, Isfahan Cardiovascular Research Institute, Isfahan University of Medical Sciences, Isfahan, Iran.

2- MD, General Practitioner MD, Head of Family Health Unit of Isfahan Health Center, Isfahan, Iran.

3- MD, Community Medicine Specialist, Isfahan Cardiovascular Research Institute, Isfahan, Iran.

4- Associated professor of Cardiology, Isfahan School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran.

5- MD, Professor of Pediatrics, Isfahan Cardiovascular Research Center, Isfahan University of Medical Sciences, Isfahan, Iran.

6- MD, Professor of Cardiology, Isfahan Cardiovascular Research Center, Isfahan Cardiovascular Research Institute, Isfahan University of Medical Sciences, Isfahan, Iran.

Correspondence To: Masoumeh Sadeghi, Email: sadeghimasoumeh@gmail.com

gynecological diseases and women's life expectancy exceeding that of men's by 10 years, ischemic heart disease remains the leading cause of mortality in women.² Studies conducted in Iran have placed women's raw health literacy level lower than that of men's, i.e. women are more exposed to consequences of low health literacy. Women are more liable to understand and/or follow written/verbal health advice offered by health professionals.³ Women either do not recognize cardiovascular disease (CVD) risk factors or deny them. Despite wide-ranging endeavors to educate and inform the public of CVD risk factors, physicians are apparently failing to fully control these risk factors in women.⁴

An important socio-economic parameter, one's occupation can influence CVD risk factors.^{5,6} Several studies have demonstrated the link between occupation and health in women. Working women are different from housewives in respect of lifestyle; CVD risk factors also occur with different frequencies in the two groups.^{7,8} Interventions aimed at health promotion and risk factor control are linked to socio-economic factors.⁹ The health education received by working women is apparently different from that received by housewives; this may be due to the difference in their socio-economic status. We investigated the effect of interventions of the Women's Healthy Heart Project of Isfahan Healthy Heart Program (IHHP) on the lifestyles of working women and housewives.

Materials and Methods

Women's Healthy Heart Project (WHHP) is a component of Isfahan Healthy Heart Program.¹⁰ It involved all women aged above 18 years in the counties of Isfahan and Najafabad (intervention areas) and Arak (control areas). Lifestyle characteristics and CVD risk factors of women were identified through situation analysis conducted in the first phase of the study in 2002. Lifestyle modification interventions were conducted using strategies geared towards education of the public, health personnel, and intersectoral collaboration involving women in the community. Lifestyle and CVD risk factors were assessed again in an independent sample after interventions lasting 5 years. In the control area, annual evaluation of independent samples of women was performed in the absence of any interventions. In the counties of intervention, all organizations that were linked to women in any form were targeted by the project.

The organizations collaborating with this project were as follows: Isfahan Provincial Government Commission for Women's Affairs, Imam Khomeini

Relief Committee, the Literacy Campaign Organization, Women's Basij, non-governmental women's groups, Isfahan radio and television broadcasting (IRIB), Women's Seminary, the Red Crescent Society, and the Center for Retirees' Welfare. All women working in government organization, factories and workshops were reached via IHHP's Worksite Intervention Project (WIP). Different strategies were used in every organization. In the beginning, education content for each group was prepared according to level of literacy and age. This included pamphlets, books, and CDs addressing various aspects of healthy living, e.g. health eating, physical activity, coping with stress, and tobacco cessation, increase knowledge about CVD risk factors and control of them. What follows is a brief description of how WHHP interventions were implemented. The strategies and operations of this project fell in three categories, namely educational, environmental, and legislative.

A) Educational: e.g. face-to-face/group training of women, pamphlets, books, training the instructors and officers responsible for institutions involved in women's affairs, public education via mass media and IRIB, offering suitable models to encourage greater physical activity at home, and publishing a video CD teaching ways of keeping active in the family.

B) Environmental: Increasing the availability of physical space for women to exercise.

C) Legislative: Integration of lifestyle training classes with existing pre-marriage classes targeting young couples, publishing an educational book compatible with the curriculum of the Literacy Campaign Organization, advocating and following through enforcement of new legislation aimed at reducing the use of hookah in traditional cafes and teahouses of Isfahan.

The main interventions in Isfahan and Najafabad were as follows:

1) Training young women attending pre-marriage classes at health/treatment centers by health advisers; information was given to couples on non-communicable diseases and ways of avoiding them. These classes last 4 hours and are held on all weekdays. Half an hour was allocated to healthy lifestyle education. This intervention was efficiently integrated into the health system and did not involve any costs.

2) Training instructors of the Literacy Campaign Organization, as well as women attending literacy courses offered by the organization. Such women are usually middle-aged. This intervention required the initial training of instructors, who would in turn pass their knowledge to learners. The educational material

was integrated with the organization's existing curriculum. Every year, the Literacy Campaign instructors were required to attend a 2-3-day workshop (4 hours/daily). Also, a book entitled "The Healthy Heart" was published for use by instructors. The content was passed on to learners during the course of the educational year.

3) Training women calling on health/treatment centers; large numbers of women visit health/treatment centers to receive various services, such as advice on family planning, childcare, and vaccination. Hence health/treatment centers were ideal locations for offering women training on non-communicable diseases, their risk factors and ways of avoiding them. The training was offered by advisers at these centers. In addition to face-to-face training sessions lasting 5 minutes, 1-2-hour group training session was also dedicated to advice for lifestyle improvement weekly. Educational posters and pamphlets were also used. Women visiting health/treatment centers were also taught how to use an automated telephone health advice line to access information on non-communicable disease and ways of avoiding them. The latter chapter was added to a pre-existing service (known as Neda-ye-Behdasht) as an IHHP initiative.

4) Training female instructors of the Red Crescent Organization was another WHHP intervention. These instructors would in turn pass on their information to volunteers working for the Society. Every year, a two-day workshop (8 hours) as well as a re-education course (2 hours) was held for female instructors of the Red Crescent Society. This intervention has been integrated in the Society's curriculum. The Society's periodical educational curriculum now contains information on CVD prevention and control.

5) Educating women in the community using radio and television programming and educational aids. Radio and television enjoy a central role as media of mass communication in the Iranian society. Women are among the core audience of these media, hence WHHP attempted to employ them to the benefit of its interventions. A number of radio and television programs, themed on non-communicable diseases, their risk factors, and healthy living were made and broadcast. Group discussions and interviews on a range of related topics were also incorporated into other routine radio and television programming. These and many other similar projects were planned and carried out within memoranda of understanding signed with Isfahan Radio and Television authority (IRIB Isfahan)

In line with educating women in the community, more than 6 titles of educational pamphlets were also published in distributed in the society (health and treatment centers, the Red Crescent Society and other intervention sites).

In other organizations, such as Imam Khomeini Relief Committee, Women's Basij, Centers for Retirees' Welfare, religious clerics, non-governmental organization, and especially for health volunteers, training was conducted by trained individuals on a periodical basis. The variables being investigated included nutrition, physical activity and major risk factors (obesity, hypertension, smoking status, diabetes disorders and lipid disorders) which were assessed in both the first and final phases. All stages of this project were periodically subjected to external and process evaluation.

For this study, initially in each phase (first and final of WHHP), a questionnaire obtaining demographic information and occupational status was completed.

Nutritional status was determined using a food frequency questionnaire and the global dietary index (GDI). This questionnaire obtained information about weekly consumption of seven food categories, namely frequency of using fast foods, fruit and vegetables, chicken, fish, cereals, soy protein, confections, hydrogenated fat, animal fat and hard margarine/butter, and olive oil. Each food category was given a score based on atherogenicity (maximum atherogenicity: 2, minimum atherogenicity: 0). Higher GDI indicated higher atherogenicity.¹¹

Total Daily Physical Activity (TDPA) was assessed in MET (Metabolic Equivalent) per day, by considering 3 types of physical activity: transport, leisure time and working at home.¹² To perform physical examination and biochemical tests in the first and final phases, the individuals were asked to present to designated centers after 12 hours of fasting. Body weight, height, waist, and circumference were measured according to international standards.¹³ Body weight and height were measured in light clothing without shoes by trained personnel. German Seca scales (± 0.5 kg) were used to measure body weight. Body height was measured using non-elastic tapes (± 0.5 cm). Body Mass Index (BMI) was calculated as weight (kg) divided by the square of height. Individuals with BMI > 30 kg/m² and/or those with waist-to-hip ratio greater than 0.8 were considered as obese.¹⁴ Waist and hip circumference were measured in standing position. Waist circumference was measured at the midpoint between the lower border of the rib cage and the iliac crest. Hip circumference

was measured at the level of femur. Waist-to-hip ratio was calculated.¹⁵

Statistical Analysis; All data were analyzed using SPSS-15. The analytical methods included Student's t-test, chi-square test, General linear model of ANOVA, and logistic regression.

Results

We studied 10586 women (6105 women before intervention, 4481 after intervention). In the first phase, 511 were working women and 5591 were housewives. After intervention, 241 were working women and 4240 were housewives. Mean age of working women before and after intervention was 34.14 ± 10.09 and 34.08 ± 9.35 years, and for housewives was 40.05 ± 14.61 and 40.36 ± 15.32 years, respectively. In every phase, there was a significant age difference between housewives and working women ($P < 0.001$). Working women generally enjoyed higher educational status than housewives; the difference between working women and housewives in respect of education was significant ($P < 0.001$). Table 1 represents mean \pm SD of physical and biochemical variables, as well as comparison of nutrition and physical activity of working women and housewives before and after intervention. These variables have changed significantly in housewives, while in working women show a significant statistical change ($P < 0.05$). After adjusting the two groups for age and despite intervention, the chance of having any of the physical factors was not significantly different between the two groups (Table 2).

Discussion

Interventions over the 5-year course of IHHP changed nutritional parameters in working women and housewives. Housewives' physical activity increased, but there was no change in the total physical activity of working women, or the percentage of passive smoking in housewives or working women. WC and waist-to-hip ratio changed significantly following interventions, however, after adjusting for age no significant difference was seen between working women and housewives despite the interventions. In working women, WC improved significantly.

Women as a distinct entity have been studied in a very limited number of wide-ranging community-based studies. A worksite study which involved interventions towards health promotion (i.e. increasing physical activity, improving eating habits, tobacco cessation) significantly increased physical activity in the

intervention group, compared to controls. Fruit and vegetable consumption also increased in the intervention groups, however, intake of fats and smoking in the two groups did not differ significantly.¹⁶ The latter study did not present data separately for men and women; nonetheless, it demonstrated the positive influence of interventions on physical activity and some aspects of nutrition in women.

A study conducted in Finland reporting the outcome of interventions aimed at improving lifestyle (1982-2002) showed that interventions led to increased leisure time physical activity in women; BMI of women increased significantly, except in women with untreated hypertension.¹⁷ Between 1993 and 2002, BMI showed an increasing trend in working women of varying occupation, as well as housewives; BMI increase was more marked in young sedentary women.¹⁸

In our study too, the effect of interventions on BMI was not significant, given the increased prevalence of obesity in women in the Iranian community. Also, other interventions implemented in Karelia, Finland to control risk factors of hypertension demonstrated a direct link between such interventions and higher socio-economic status (i.e. better control in higher socio-economic brackets). However, interventions proved effective across the entire socio-economic spectrum, with blood pressure decrease occurring in the entire population. Authors recommended that regular community-based programs for risk factor control should be conducted throughout the community, although people benefit from these interventions to varying degrees.⁹ A US study of the prevalence of CVD risk factors in working women and housewives demonstrated mean BMI to be higher in housewives than in working women; and active smoking was found to be higher in working women. Tehran sugar and lipid study also showed that 17% of housewives and 9% of working women have 4-6 CVD risk factors; BMI, waist circumference, waist-to-hip ratio in housewives was significantly higher than in working women.¹⁹ Another study showed smoking and alcohol intake to be less in working women, who were also more physically active than housewives. The latter study suggested that working women enjoyed better health than housewives.²⁰ These three studies underline the need for community-based interventions, especially those targeting housewives.

A study which investigated cigarette smoking in South Korea between 1999 and 2003 demonstrated an increasing trend in women.²¹ Another study in the same country showed an increase in smoking among women aged 20-44, while smoking seemed to have decreased in women aged > 45 years.²² Another study showed that interventions encouraging tobacco use

Table 1. Changes in anthropometrics and nutritional parameters of working women and housewives before and after WHHP interventions

		Housewives 2001	Housewives 2007	P	Working 2001	Working 2007	P
BMI ¹	C	26.41 ± 4.96	26.68 ± 4.65	0.042	26.12 ± 4.91	25.53 ± 4.88	0.384
	I	27.27 ± 5.30	27.00 ± 5.06	0.083	26.01 ± 4.96	25.74 ± 4.83	0.579
	P	< 0.001	0.039	0.008*	0.809	0.766	0.706
W/h ²	C	0.89 ± 0.10	0.91 ± 0.09	< 0.001	0.86 ± 0.10	0.85 ± 0.08	0.282
	I	0.93 ± 0.08	0.90 ± 0.09	< 0.001	0.91 ± 0.09	0.84 ± 0.08	< 0.001
	P	< 0.001	0.039	< 0.001	< 0.001	0.601	0.001
W ³	C	89.62 ± 13.59	92.95 ± 13.16	< 0.001	87.99 ± 12.45	87.80 ± 13.42	0.919
	I	97.18 ± 13.32	90.98 ± 13.37	< 0.001	92.79 ± 13.16	84.74 ± 12.31	< 0.001
	P	0.000	0.000	< 0.001	0.000	0.116	0.001
GDI ⁴	C	1.09 ± 0.23	1.01 ± 0.29	< 0.001	1.12 ± 0.24	1.01 ± 0.31	0.002
	I	1.03 ± 0.28	0.80 ± 0.30	< 0.001	1.12 ± 0.26	0.82 ± 0.32	< 0.001
	P	0.000	0.000	< 0.001	0.773	< 0.001	< 0.001
TDPA ⁵	C	644.74 ± 382.58	654.74 ± 364.63	0.331	1094.75 ± 435.85	1020.46 ± 609.09	0.251
	I	640.24 ± 416.62	697.98 ± 475.74	< 0.001	1070.87 ± 457.68	1055.77 ± 552.24	0.718
	P	0.458	0.001	0.002	0.553	0.762	0.491

1. BMI: Body Mass Index

2. W/h: Waist to hip ratio

3. W: waist

4. GDI: Global Dietary Index

5. TDPA: Total Daily Physical Activity

C: Control

I: Intervention

P: P value of intervention

cessation through mass media can favorably influence cigarette-related behaviors and even lead to decreased consumption. However, time of broadcasts, their frequency and continuity seemed to affect the effectiveness of interventions; the study also showed that the outcome of such interventions were not related to age, sex, education and/or race.²³

Given the generally lower consumption of tobacco products in the Iran than in Western countries, and the rising trend of smoking in women, the difference between working women and housewives in respect of active smoking was insignificant.

In a study assessing interventions conducted through mass media and workplace health advisers showed, smoking in working subjects undergoing interventions fell from 39% to 30%, but remained unchanged at 33% in working controls. CVD risk factor score in working subjects in the intervention group decreased from 3.1% to 2.7%, but decreased from 3.2% to 3% in controls;²⁴ the study demonstrated the effectiveness of worksite interventions. Studies have shown that accessibility and ease of participation in worksite educational programs aimed at raising awareness of, and control

Table 2. Outcomes of intervention in working women to housewives in intervention and control areas, based on WHHP findings

variable	Control group			Intervention group		
	OR	CI	P	OR	CI	P
BMI > 3	0.49	0.22-1.07	0.07	0.82	0.48-1.38	0.45
WHR > 8	0.52	0.27-1.07	0.05	0.60	0.34-1.07	0.08
Cigarette(%)	1.58	0.16-15.56	0.70	7.28	1.10-48.22	0.04

of CVD risk factors, make such programs more effective than mass media education.^{16,24}

Worksite educational programs for CVD risk factor control, community support, and social networking among workers encourage and reinforce healthy behaviors in working colleagues.²⁵

The literature contains few sex-specific studies on women, but from the results of existing studies and our study, it seems that working women and housewives have different health requirements, which should be matched by interventions which target them.

In our study, the effect of interventions on housewives was more significant. It may be suitable to design interventions specifically targeting working women. Women comprise nearly half of the community and their health directly impacts on that of the whole family. Mothers with healthy behaviors pass them on to their children. The following measures may be required as part of a regular community-based intervention program dedicated to women's cardiovascular health:

- continuing intervention programs for CVD risk factor control through mass media (radio, television, newspapers, journals)
- education at venues of women's gatherings and worksites
- facilitating women's access to dedicated spaces where they can exercise without cultural/religious hindrance
- advocating legislation facilitating physical activity of women in worksites
- allowing distribution only of healthy snacks at workplace
- ensuring supply of healthy food products to housewives
- offering tobacco cessation advice/services

Acknowledgments

The authors extend their thanks to the personnel of health centers 1 and 2 of Isfahan and Najafabad, and health centers of Arak for their contribution to this study. We also thank Miss Yazdekhashti from Isfahan Cardiovascular Research Center.

Conflict of Interests

Authors have no conflict of interests.

References

1. Vaskilampi T. Sociological aspects of community-based health intervention programmes. The North Karelia Project as an example. *Rev Epidemiol Sante Publique* 1981; 29(2): 187-97.
2. Mark DB. Sex bias in cardiovascular care: should women be treated more like men? *JAMA* 2000; 283(5): 659-61.
3. Tehrani beni A, Amirkhani MA, Haghdoost AA, Alaviyan M, Asgharifard H, Baradaran H, et al. Health literacy in 5 province of Iran and effective etiology of it. *Strides in Development of Medical Education* 2007; 4(1): 1-9.
4. Wong J, Wong S. Trends in lifestyle cardiovascular risk factors in women: analysis from the Canadian National Population Health Survey. *Int J Nurs Stud* 2002; 39(2): 229-42.
5. Pekkanen J, Tuomilehto J, Uutela A, Vartiainen E, Nissinen A. Social class, health behaviour, and mortality among men and women in eastern Finland. *BMJ* 1995; 311(7005): 589-93.
6. Kivimäki M, Leino-Arjas P, Luukkainen R, Riihimäki H, Vahtera J, Kirjonen J. Work stress and risk of cardiovascular mortality: prospective cohort study of industrial employees. *BMJ* 2002; 325(7369): 857.
7. Carson AP, Rose KM, Catellier DJ, Diez-Roux AV, Muntaner C, Wyatt SB. Employment status, coronary heart disease, and stroke among women. *Ann Epidemiol* 2009; 19(9): 630-6.
8. Ainy E, Azizi F. Women, occupation and cardiovascular risk factors: findings from the Tehran Lipid and Glucose Study. *Public Health* 2007; 121(12): 950-3.
9. Nissinen A, Tuomilehto J, Salonen JT, Kottke TE, Piha T. The influence of socioeconomic factors on blood pressure control during a community-based hypertension control programme. *Acta Cardiol* 1986; 41(2): 99-109.
10. Sarraf-Zadegan N, Sadry GH, Malek Afzali H, Baghai M, Mohammadifard N, Shahrokhy SH, et al. Isfahan Healthy Heart Program: A Comprehensive Integrated Community-based Program for Cardiovascular Disease Prevention and Control. *Acta Cardiologica* 2003; 58(4): 309-320.
11. Mohammadifard N, Kelishadi R, Safavi M, Sarrafzadegan N, Sajadi F, Sadri GH, Maghroon M, Alikhasi H, Heydari S, Sarmadi F. Effect of a community-based intervention on nutritional behaviour in a developing country setting: the Isfahan Healthy Heart Programme. *Public Health Nutr.* 2009; 17: 1-9. (Epub ahead of print).
12. Saidi M, Rabiee K, Kelishadi R, Sadeghi M, Roohafza HR. Relation between leisure time physical activity and TC watching with atherosclerotic risk factors. *Iranian Journals* 2003; 71: 31-7.
13. Obesity: preventing and managing the global epidemic. Report of a WHO consultation. *World Health Organ Tech Rep Ser* 2000; 894: i-253.
14. National Institutes of Health. The Practical Guide: Identification, Evaluation, and Treatment of Overweight and Obesity in Adults. 2000.
15. Sadeghi M, Poormoghadas M, Roohafza HR, Talaei M, Golshadi I. The relationship between women physical fitness and obesity and the severity of CAD. *The journal of Qazvin Univ of Med Sci* 2008; 12(1).
16. Emmons KM, Linnan LA, Shadel WG, Marcus B, Abrams DB. The working healthy project: A worksite health-promotion trial targeting physical activity, diet and smoking. *J Occup Environ Med* 1999; 41(7): 545-55.
17. Katarinen M, Laatikainen T, Salomaa V, Jousilahti P, Antikainen R, Tuomilehto J, Nissinen A, Vartiainen E. Trend in life style factors affecting blood pressure in

- hypertensive and normotensive Finns during 1982-2002. *JHypertens*.2007;25(2):299-305.
18. Colchero M.A, Caballero B, Bishai D. The effect of income and occupation on body mass index among women in the Cebu Longitudinal health and nutrition surveys (1983- 2002). *Social Sience & Medicine* 2008; 66: 1967- 78.
 19. Ainy E, Azizi F. Women, occupation and cardiovascular risk factors: Findings from the Tehran lipid and glucose study. *Journal of the Royal Institute of Public Health* 2007;121: 950-53.
 20. Kritz- Silverstein D, Wingard DL, Barrett- Connor E. Employment status and heart disease risk factors in middle- age women: the Rancho Bernardo Study. *Am J of Pub Health* 1992; 82(2):215-219.
 21. Cho H-J, Khang Y-H, Jun H-J, Kawachi I. Marital status and smoking in korea: The influence of gender and age. *Social Science & Medicine* 2008 66:609-619.
 22. Khang Y-H, Cho H-J. Socioeconomic inequality in cigarette smoking: Trend by gender, age, and socioeconomic position in South Korea, 1989-2003. *Preventive Medicine* 2006; 42:415-422.
 23. Bala M, Strzeszynski K, Cahill K. Mass media interventions for smoking cessation in adult. *Cbchrane Data base Syst Re*, 2008 Jan; (1).
 24. Puska P, Niemensivu H, Puhakka P, Alhainen L, Koskela K, Moisio S, Viri L. Result of one year worksite and mass media base intervention on health behavior and chronic disease risk. *Scand J Soc Med*1988; 16(4):241-50.
 25. Suzan JW Robroek, Folef J Bredt, Alex Burdor F. The cos- effectiveness of an individually tailored long term work site health promotion program on physical activity and nutrition: Design of a pragmatic cluster randomized controlled trail. *BMC Public Health*2007; 7: 259.

Archive of SID