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Effect of Health Education on Changes in Dietary Habit and Cardiovascular Risk Factors among Sedentary Workers

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The study was done to assess the effect of health education on readiness to change dietary habit and change in cardiovascular risk factors among employees. The study was pre-, post-test study and conducted in Myanmar Timber Enterprise (Head Quarter), Kyokone, Insein Township, Yangon during 2011. A total of 196 employees underwent the screening procedures for cardiovascular risk factors (measurement of height and weight, waist circumstances, blood pressure, fasting plasma glucose and lipids profile). Among them, 36.7%, 11.7%, 17.8% and 19.4% of employees had hypertension, diabetes, hypercholesterolemia and obesity, respectively. After screening procedures, 50 employees with one or more cardiovascular risks (obesity/diabetes/hypertension/hypercholesterolemia) gave consents to attend bimonthly health education sessions (promotion of healthy dietary habits and physical activity) for six months. After six months of intervention, the end-line assessment on body weight, waist circumstance, blood pressure, fasting plasma glucose and lipid profile was done on 33 participants. Change in dietary habit was interviewed with the structured questionnaires before and after health education. At the end-line assessment, 32 employees had changed their dietary habit but one employee could not change his dietary habit in spite of increasing knowledge. Mean body mass index, waist circumference, fasting blood sugar, mean total cholesterol before and after intervention were 30±4.2 *vs.* 29.8±4.3, 91.8±9.1 *vs.* 91.2±9.2 cm, 110.9±48.1 *vs.* 107.5±38.6 mg%, 188.4±56.5 *vs.* 191.5±37.4 mg%, respectively. These findings could not support obvious effect on changes in cardiovascular risk factors. It might be due to short duration between two assessments.

INTRODUCTION

Noncommunicable diseases (NCDs) are the biggest cause of death worldwide according to the WHO Global Status Report on NCDs, 2010. More than 36 million people died from NCDs in 2008, mainly cardiovascular diseases (48%), cancers (21%), chronic respiratory diseases (12%) and diabetes (3%). More than 9 million of these deaths occurred before the age of 60 and could have largely been prevented. Premature deaths from NCDs ranged from 22% among men and 35% among women in low-income countries to 8% among men and 10% among women in high-income countries.[1] Common, preventable risk factors underlie most NCDs. These risk factors are a leading cause of the death and disability burden in nearly all countries, regardless of economic development. The leading risk factor globally for mortality is raised by blood pressure (responsible for 13% of deaths globally), followed by tobacco use (9%), raised blood glucose (6%), physical inactivity (6%), and overweight and obesity (5%).[2]

Noncommunicable Diseases Country Profiles (2011) showed that 20% of total death in all

ages in Myanmar were due to cardiovascular diseases (CVD) The main forms of CVD are CHD and stroke.[3] According to WHO stepwise approach to NCD surveillance, Myanmar (2004), the prevalence rates were: hypertension (M 21.1%, F 29.3%), physical inactivity (M 88.3%, F 95%), raised cholesterol (M 25.1%, F 37.3%), obesity (M 21.1%, F 29.3%) and diabetes (M 11%, F 12.3%).[4]

Cardiovascular disease is the major cause of death in many countries. The major causal risk factors for cardiovascular disease are smoking, high blood pressure, high plasma cholesterol, low HDL cholesterol and high plasma fasting glucose. An aggressive primary prevention in high-risk individuals gives the highest risk reduction, but they constitute only a small fraction of the population. Therefore, a broader approach with long-term prevention in individuals at moderate risk of cardiovascular disease is desirable.

Obesity, physical inactivity, and unhealthy eating habits are major risk factors for chronic disease, disability, and premature death.[5, 6] The combination of eating a balanced, reduced calorie, diet and regular physical activity has a stronger effect on long-term weight loss than either strategy alone;[7, 8] therefore, both strategies are needed. A better understanding of the relationships among multiple behavioral risk factors is important for the design of individual, clinical, and public health interventions, particularly cost-effective interventions to target high-risk individuals and population subgroups.[9]

From a behavioral sciences perspective, the stages of change from the Transtheoretical Model suggest that individuals can be at different stages of readiness to change for different behavioral risk factors. Each behavioral risk factor has its own set of knowledge, attitudes, intentions, decisional balance, and self-efficacy.[10] Motivational readiness described in the stages of change model[11] has been used to tailor interventions to an individual's level of motivational readiness to change behavior. Interventions tailored to match level of motivational readiness outperform standard interventions.[12]

With lifestyle behavioral choices contributing to a significant proportion of chronic diseases globally, evidence-based strategies to improve behavioral risk factors such as healthier eating and regular physical activity should be considered in a variety of settings. Recent research had shown that effective worksite health promotion programmes were those that offered multiple risk-factor interventions combined with group participation and individualized risk reduction counselling to high-risk employees. These programmes were found to produce positive clinical[13] and cost[14] outcomes such as increases in health awareness, risk reduction, disease prevention and a reduced demand for health services.

Workplaces are considered to be a key channel for the delivery of interventions to reduce chronic diseases. The workplace offers several advantages in that a substantial number of the working population can be reached and multiple levels of influence on behavior can be targeted. Workplace health program can identify and prevent major chronic disease risks to an extent that decrease clinical risk costs in health system and improves overall economic output. National and international data consistently demonstrate that the investment of workplace health program delivers a rate of return on investment or cost/benefit ratio of about 1:5.

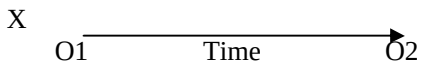
A healthy workplace offers the ideal setting for introducing health promotion programs: since the majority of the adult population spends approximately one-third of their daily life at work, the workplace offers an excellent environment for promoting health. If neglected, the work environment can have extremely negative consequences for workers' health, causing stress, injury, illness, disability and death. A healthy workplace promotes the overall success of the organization: a healthy workplace can result in changes that are beneficial to the

long-term survival and success of an organization. Benefits include improved worker health status, increased job satisfaction, enhanced morale and work productivity and cost savings (e.g. reduced absenteeism and employee turnover, lower health care and insurance costs). There were no intervention studies before to assess the effect of health education on changes in cardiovascular risk factor in work place setting. Therefore, this study aimed to promote healthy lifestyle by improving dietary habit and reduction of cardiovascular risk factors among employees in selected workplace.

MATERIALS AND METHODS

Study design

Pre-, post- test design was used. The design is depicted in figure below.



Where, X=A program intervention
O1=A baseline measurement
O2=An end line measurement
Time= intervention period (6 months)

The study was started with identification of employees with cardiovascular risk factors. Then, the risk persons were counseled how to practice healthy eating and be more physically active through small group education session. After six-month intervention, these risk factors were reassessed.

Study area

The study was conducted in Myanmar Timber Enterprise (Head Quarter), Kyokone, Insein Township.

Study population

Employees of Myanmar Timber Enterprise (Head Quarter)

Inclusion criteria for identification of cardiovascular risk factors

- Employees of Myanmar Timber Enterprise (Head Quarter) with the age more than 30 years
- Both sexes

Exclusion criteria for identification of cardiovascular risk factors

- The employees who plan to retire during the intervention period
- Pregnant women and lactating mothers

Inclusion criteria for intervention

The employees who have body mass index ≥30.0 with or without systolic blood pressure ≥140 mmHg or diastolic blood pressure ≥90 mmHg or total cholesterol ≥220 mg/dl or fasting glucose ≥110 mg/dl

Sampling method

Sampling method was nonprobability sampling method. A convenience sample was recruited from Myanmar Timber Enterprise (Head Quarter) in Yangon. Employees from Myanmar Timber Enterprise (Head Quarter) were selected as the studied population because majorities of them are middle-aged adults and their nature of work is sedentary. The authorities from this department were willing to participate in this intervention after advocating. After giving an explanation about the purpose, the study procedures, risks and benefits of participating, a total of 200 employees who met the inclusion criteria gave consents to participate actively in the study. Interviewer training and validation of data collecting tools were also carried out before actual survey was conducted. Identification of the employees and personal medical history were asked with the structured questionnaires.

For the screening of cardiovascular risk factors among employees, body weight, height and blood pressure were measured. After 10-hour overnight fast, 3 ml of venous blood samples were taken for determination of plasma lipid profile and fasting plasma glucose. Fasting plasma lipid profile and plasma glucose were determined by standard laboratory procedure at Nutrition Research Division, Department of Medical Research (Lower Myanmar).

After screening procedures, the participants with one or more cardiovascular risk factors

were chosen as subjects for the intervention which promotes the health status of them through healthy eating and more physical activity. Among 200 employees, only 59 employees (30.1%) did not have risk factors and 137 employees (69.9%) had one or more risk factors. Employees with risk factors undergone ECG and consulted with physician for further treatment. After screening procedures, 50 employees with one or more cardiovascular risks (obesity/ diabetes/hypertension/hypercholesterolemia) gave consents to attend bimonthly health education sessions (promotion of healthy dietary habits and physical activity) for six months.

After six education sessions (third month of intervention), interim assessments on 35 employees were done by using the structured questionnaire for readiness to change the dietary habit and promotion of physical activity. Only 33 employees participated in the end-line assessment. Health education talk entitled "Healthy Lifestyle and Prevention of Noncommunicable Diseases" by Professor Tint Swe Latt was also conducted after interim assessment. After six months of intervention, the end-line assessment on body weight, waist circumstance, blood pressure, fasting plasma glucose and lipids profile was done on 33 participants. Change in dietary habit and physical activity was interviewed with the structured questionnaires.

Data entry and analysis

Data entry and analysis was done with SPSS 11.0. Univariate categorical data were presented with frequency and percent tables and those of continuous variables were presented with mean±SD. Difference between means before and after health education was calculated by paired 't' test. The level of significance was set at p value <0.05.

Ethical considerations

The proposal was submitted to the Institutional Ethical Review Committee, Department of Medical Research (Lower Myanmar) for approval.

RESULTS

A total of 196 employees participated in screening of cardiovascular risk factors. Among them, 29.6% were males and 70.4% were females with mean age of 44.3±7.8 with minimum 30 years and maximum 58 years. Larger proportion of employees were clerical staffs and 16.3% and 6.1% of employees were officers and workers/ drivers, respectively (Table 1).

Table 1. Background characteristics of employees participated in screening procedure

	Male No. (%)	Female No. (%)	Total No. (%)
Age group(years)			
30-39	12(18.8)	52(81.3)	64(32.7)
40-49	16(21.6)	58(78.4)	74(37.8)
≥50	27(46.6)	31(53.4)	58(29.6)
Education level			
Less than high school	-	4(100)	4(12.1)
High school level	-	13(100)	13(39.4)
Graduate	2(12.5)	14(87.5)	14(48.5)
Rank			
Officer	12(37.5)	20(62.5)	32(16.3)
Clark	40(26.3)	112(73.7)	152(77.6)
Worker/Driver	6(50)	6(50)	12(6.1)
Total	58(29.6)	138(70.4)	196

Table 2 shows the overall prevalence of overweight, obesity, hypertension, diabetes and hypercholesterolemia among employees. Prevalence of overweight, obesity, hypertension, diabetes and hypercholesterolemia among employees were 36.7% (M-41.4%, F-34.8%), 19.4% (M-8.6%, F-23.9%), 36.7% (M-41.4%, F-34.8%), 11.7% (M-12.0%, F-11.7%) and 17.8% (M-12.1%, F-20.3%), respectively.

Among 33 employees who participated in the intervention programme, only 2 employees were males and the rest were females. Mean age of employees was 48.2±6.2 years with minimum 37 years and maximum 57 years. Seven employees were officers and the rest were clerical staffs. Five (15.2%), 12(36.4%), 13(39.4%) and 3(9.1%) employees had one, two, three and four risk factors, respectively. The persons with only one risk factor were obese persons.

Table 2. Prevalence of risk factors of cardiovascular disease in employees participated in screening procedure

Variables	Mean	SD	No.	%
Waist circumference (cm)	81.2	13.7		
Body mass index (BMI)	25.8	4.8		
Weight status				
Underweight (BMI <18.5)			9	4.6
Normal (BMI 18.5-24.9)			77	39.3
Overweight (BMI 25-29.9)			72	36.7
Obesity (BMI ≥30)			38	19.4
Hypertension				
No			124	63.3
Yes			72	36.7
Systolic blood pressure (mmHg)	125.5	17.5		
Diastolic blood pressure (mmHg)	81.8	10.1		
Diabetes mellitus				
No			171	87.3
Yes			23	11.7
Fasting blood sugar (mg%)	96.4	35.8		
Hypercholesterolemia				
No			161	81.2
Yes			35	17.8
Total serum cholesterol (mg%)	177.3	45.3		

Table 3. Comparison of cardiovascular risk factors before and after health education

Risk factors	Health education		Mean difference in changes (95% CI)	p value*
	Before	After		
Mean weight (lb)	151.8 ±25.3	151.2 ±26.3	-0.6 (-1.21 to 2.4)	0.5
Mean BMI	29.9 ±4.2	29.8 ± 4.3	-0.13 (-0.23 to 0.48)	0.47
Mean waist circumference (cm)	91.8 ±9.1	91.2 ±9.1	-0.61 (-0.88 to 2.12)	0.41
Mean systolic blood pressure (mmHg)	138.8 ±16.7	128.2 ±21.4	-10.6 (5.15 to -16.07)	0.00*
Mean diastolic blood pressure (mmHg)	87.8 ±8.9	84.5 ±10.3	-3.33 (-0.17 to 6.84)	0.62
Mean fasting blood glucose (mg %)	110.9 ±48.1	107.4 ±38.6	-3.04 (-6.29 to 12.38)	0.52
Mean total serum cholesterol (mg%)	188.4 ±56.5	191.5 ±37.4	3.09 (-20.51 to 14.3)	0.72
Mean LDL-cholesterol (mg%)	122.3 ±45.3	136.5 ±40.2	14.16 (-32.26 to 3.93)	0.12
Mean HDL-cholesterol (mg%)	42.4 ±12.9	46.0 ±14.3	3.58 (-9.12 to1.97)	0.19
Mean triglyceride (mg%)	133.9 ±52.7	112.1 ±41.8	-21.89 (4.83 to -38.96)	0.01*

*=Statistically significant

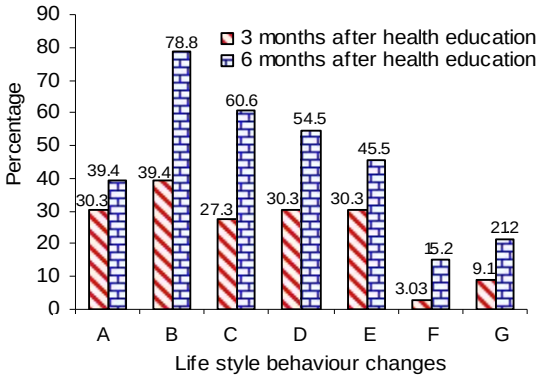
Table 3 shows changes in cardiovascular risk factors 6 months after health education. Other than total cholesterol and LDL-cholesterol, reduction in parameters was seen but not statistically significant except mean systolic blood pressure and mean triglyceride. Mean HDL-cholesterol level was increased but the difference was not statistically significant.

Table 4. Means systolic and diastolic blood pressure, fasting blood sugar, total cholesterol level and mean difference of employees by categories

	Mean ±SD	Mean difference of change	P value*
Participant with no hypertension			0.09
Baseline systolic blood pressure	125 ±7.6		
Endline systolic blood pressure	115 ±14.1	-10.0 (-1.8 to 21.8)	
Participant with hypertension			0.003*
Baseline systolic blood pressure	143.2 ±16.5		
Endline systolic blood pressure	132.4 ±21.8	-10.8 (4.2 to 17.4)	
Participant with no hypertension			0.285
Baseline diastolic blood pressure	81.2 ±3.5		
Endline diastolic blood pressure	77.5 ±8.9	-3.8 (-3.9 to 11.4)	
Participant with hypertension			0.133
Baseline diastolic blood pressure	90 ±9.1		
Endline diastolic blood pressure	86.8 ±9.9	-3.2 (-1.05 to 7.4)	
Participant with no hypercholesterolemia			0.05*
Baseline total cholesterol	163.08 ±35.6		
Endline total cholesterol	179.91 ±33.5	16.86 (4.39 to 33.61)	
Participant with hypercholesterolemia			0.402
Baseline	218.7 ±62.8		
Endline	205.3 ±38.1	-13.39 (-19.8 to -46.6)	
Participant with nondiabetes			0.127
Baseline	87.7 ±12.7		
Endline	90.8 ±7.3	3.09 (-7.13 to 0.95)	
Participant with diabetes			0.23
Baseline	183.4 ±45.7		
Endline	161 ±46.4	22.12 (17.8 to 62.2)	

*= Statistically significant

The participants were stratified into normal and hypertension, diabetes and hypercholesterolemia; the mean difference was more pronounced in participants with hypertension, diabetes and hypercholesterolemia than normal participants (Table 4). Percentages of employees with reduction in intake of rice, fatty food, salt, sweet foods and



A= Reduced rice intake
B= Reduced fatty food intake
C= Reduced sweet food intake
D= Reduced salt intake
E= Increased vegetables intake
F= Increased fruits intake
G=Increased exercise

Fig. 1. Life style behavior changes after health education among employees

increasing vegetables and fruits consumption and physical activity were markedly different at 3 months and 6 months after health education (Fig. 1).

DISCUSSION

The prevalence of overweight and obesity in this study was higher than those in risk factor studies in Yangon Region (2004) and nationwide survey (2009) (36.7% *vs.* 23.8% *vs.* 29.9% and 19.4% *vs.* 7.9% *vs.* 6.8%). This high prevalence may be due to the sedentary nature of work of employees.

Prevalence of hypertension in present study (36.7%, M-41.4%, F-34.8%) was similar with those of raised blood pressure in high-, low-, lower-middle and upper-middle-income countries all having rates of around 40% for both sexes.[15] Prevalences of diabetes mellitus and hypercholesterolemia among employees, i.e., 11.7% and 17.8% were higher than those of age-standardized adult diabetes study in which prevalences were 9.8% among men and 9.2% among women in 2008.[16] In comparison with the global prevalence of raised total cholesterol in 2008[17] (38%), the prevalence of hypercholesterolemia in present study was only 17.8% and this may be due to higher cut-off point than global prevalence (high cholesterol >190 mg%).

Changes in cardiovascular risk factors after health education showed that systolic blood pressure and triglyceride level were significantly reduced ($p<0.05$). Similar finding was found in worksite health promotion programme in Kuala Lumpur, Malaysia.[18] There were reductions in body mass index, weight, diastolic blood pressure and fasting blood sugar but not statistically significant.

In this study, mean HDL-cholesterol level became higher after health education. This may be due to combined effect of dietary changes and physical activity. Physically active employees had higher mean HDL-cholesterol level than physically inactive employees (42.5±9.9 *vs.* 47.1±15.4) but not statistically significant. Mean levels of total cholesterol and triglyceride were increased which were similar to the findings in Malaysian study. Mean difference of risk factors between before and after intervention in the present study was comparable to Malaysian study in which intervention period was 2 years.

Reduction in mean total cholesterol (-13.39) was found in employees with hypercholesterolemia but increasing mean cholesterol level of 16.86 (95%CI; from 4.39 to 33.61), within normal limit, was seen in employees with no hypercholesterolemia. This reduction may be due to the additional effect of reduction of fatty foods and medication. Reduction of fatty food intake was found in employees with hypercholesterolemia than employees with no hypercholesterolemia (100% *vs.* 64.7%). Similar finding was found in employees with diabetes and reduction of mean fasting blood sugar (-22.12) may be due to the effect of avoidance of sweet food in addition to medication effect (avoidance of sweet foods is 100% in employees with diabetes). Although reduction of salt intake was more prevalent in employees with hypertension, the means in systolic and diastolic blood

pressures both in nonhypertensive and hypertensive employees were not much different. The study done at New York in 2004 found that changes in dietary fat intake and fruit and vegetables changes were related.[19]

In the present study, such relationship was not found between the variables but statistically significant relationship was found between diabetes and increasing vegetable consumption (p=0.04). Reduction in rice consumption was found only in employees with diabetes than nondiabetes employees (50% *vs.* 37.5%) and did not find in employees with overweight/obesity, hypertension and hypercholesterolemia.

In regard with readiness of changing diet and physical activity, 32 employees had changed their dietary habit but one employee could not change his dietary habit in spite of increasing knowledge at the endline assessment. Thirty-one employees had active stage indietary changes. Among 33 employees: 8, 18 and 7 employees had no change, ready to change and active stage in physical activity changes, respectively.

The employee with no change in dietary habit did not change his physical activity and his biochemical parameters were not markedly changed after health education. One employee with ready to change dietary habit was in the stage of ready to change physical activity. Physically active employees had lesser waist circumference, body weight and body mass index than non-active employees (94.8 *vs.* 90.1 cm, 31.7 *vs.* 29.2 and 170.8 lb *vs.* 144.9 lb, respectively).

Conclusion and recommendations

All of the risk factors except total cholesterol and triglycerides showed some extent of changes after health education in the intervention population. But more different parameters between two assessments were found in employees with hypertension, diabetes and hypercholesterolemia than normal employees.

Our study demonstrated a moderate improvement in cardiovascular risk reduction following health education about healthy eating and physical activity. To achieve a greater impact of worksite health promotion, future strategies should aim at providing a more conducive environment to facilitate individual behaviour change. In this study, there was not much improvement in self-reported exercise or physical activity. In order to encourage exercise among the participants, structured exercise programmes should be implemented within the working hours. The data suggested that a worksite approach in health promotion programs on cardiovascular risk factors can be implemented.

Future research like randomized controlled trial is needed to show the effectiveness of multiple risk factor interventions and can be compared within and between groups. Furthermore, a critical issue is how health-care providers can reach and motivate patients who need to change behaviors, but are unwilling to communicate. This was the first study that observed the effect of health education to change modifiable risk factors of cardiovascular diseases in work place setting. There were several limitations in the study. It was a pilot study, the sample size was relatively small, the intervention period is short and the subjects were not randomly selected.

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REFERENCES

1. Global Status Report on Non-communicable Diseases, 2010. Geneva, World Health Organization, 2011.
2. Global health risks: Mortality and burden of disease attributable to selected major risks. Geneva, World Health Organization, 2009.
3. World Health Organization. Non-communicable Diseases Country Profiles 2011.
4. Tint Swe Latt, Phyu Phyu Aung, *et al*. Prevalence of adult diabetes mellitus and its socio-demographic, behavioral and physiological risk factors in Yangon Division, Myanmar. *Myanmar Health Research Congress, Programmes and Abstracts* 2005; 11.
5. US Department of Health and Human Services: Healthy People (2010). With understanding and improving health and objectives for improving Printing Office, 2000.
6. McGinnis JM & Foege WH. Actual causes of death in the United States. *The Journal of the American Medical Association* 1993; 270: 2207-2212.
7. Jakicic JM, Wing RR & Winters-Hart C: Relationship of physical activity to eating behaviors and weight loss in women. *Medicine & Science in Sports & Exercise* 2002; 34: 1653-1659.
8. Riebe D, Greene GW, Ruggiero L, Stillwell KM, *et al*. Evaluation of a healthy-lifestyle approach to weight management. *Preventive Medicine* 2003, 36: 45-54.
9. Dietz WH: The effects of physical activity on obesity. *Quest* 2004; 56: 1-11.
10. Emmons KM, Marcus BH, Linnan L, Rossi JS & Abrams DB. Mechanisms in multiple risk factor interventions: Smoking, physical activity, and dietary fat intake among manufacturing workers. *Preventive Medicine* 1994; 23: 481-489.
11. Prochaska JO, Velicier WF, Rossi JS & Goldstein MG. Stages of change and decisional balance for 12 problem behaviors. *Health Psychology* 1994; 13: 39-46.
12. Prochaska JO & DiClemente CC. Stage and processes of self change in smoking: Towards an integrative model of change. *Journal of Consulting and Clinical Psychology* 1983; 51: 390-395.
13. Marcus BH, Emmons KM, Simkin-Silverman LR, Linnan LA, *et al*. Evaluation of motivationally tailored versus standard self-help physical activity interventions at the workplace. *American Journal of Health Promotion* 1998; 12: 246-253.
14. Pelletier KR. A review and analysis of the clinical and cost-effectiveness studies of comprehensive health promotion and disease management program at the worksite: 1998-2000 update. *American Journal of Health Promotion* 2001; 16: 107-116.
15. Aldana SG. Financial impact of health promotion programs: A comprehensive review of the literature. *American Journal of Health Promotion* 2001; 15: 296-320.
16. Danaei G, *et al*. National, regional and global trends in fasting plasma glucose and diabetes prevalence since 1980: Systematic analysis of health examination surveys and epidemiological studies with 370 country-years and 2.7 million participants .*Lancet* 2011; 378: 31-40.
17. Farzadfar F, *et al*. National, regional and global trends in serum total cholesterol since 1980: Systematic analysis of health examination surveys and epidemiological studies with 321 country-years and 3.0 million participants. *Lancet* 2011; 377: 578-586.
18. Foongming M, Atiya AB, Sallam & Wong M. The results of a worksite health promotion programme in Kuala Lumpur, Malaysia. *Health Promotion International.*
19. Taylor WC, Hepworth JT, Lees E, Cassells A, *et al*. Readiness to change physical activity and dietary practices and willingness to consult healthcare providers. *Health Research Policy and Systems* 2004; 2:2 doi: 10. 1186/ 1478-4505-2-2.