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Artikel Asli/*Original Articles*

Effectiveness of a Structured Weight Management Programme at Workplace among Employees of a Petroleum Industry in Malaysia

(Keberkesanan Program Pengurusan Berat Badan yang Berstruktur di Tempat Kerja dalam Kalangan Pekerja Industri Petroleum di Malaysia)

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ABSTRACT

Recognising the epidemic of overweight and obesity among Malaysians, formulation of intervention programmes such as a weight management programme at workplace is essential. This study aimed to determine the effectiveness of a structured weight management programme at workplace among overweight and obese employees. In this quasi-experimental study, sixty-four of overweight and obese adults were recruited and divided into two groups (intervention group, n = 32 and control group, n = 32). Subjects in the intervention group received three months scheduled programme and the control group received a routine weight management consultation from dietitians. Significant group effect was found on waist circumference (WC) in men ($p < 0.05$) and Body Mass Index (BMI) in women ($p < 0.05$). Men from the intervention group had reduced their WC by 3.4% (-3.7 cm) as compared to controls of 0.7% (-0.8 cm). Women in the intervention group improved their BMI by 1.4% (-0.4 kg/m^2) as compared to controls at 0.3% (-0.1 kg/m^2). Total cholesterol and LDL-C reduced among women in both intervention and control group with significant time effect ($p < 0.05$). As a conclusion a structured weight management programme effectively improved WC in men and BMI in women, and appeared to be as effective as individual diet counselling by dietitians in improving lipid profiles in women.

Keywords: Obesity; health promotion; structured programme; intervention; workplace

ABSTRAK

Menyedari masalah berlebihan berat badan dan obesiti semakin menular dalam kalangan masyarakat Malaysia, pembentukan program intervensi seperti program pengurusan berat badan di tempat kerja adalah penting. Kajian ini bertujuan untuk menentukan keberkesanan program pengurusan berat badan yang berstruktur di tempat kerja dalam kalangan pekerja yang berlebihan berat badan dan obes. Dalam kajian percubaan kuasi ini, 64 orang dewasa yang mempunyai berat badan berlebihan dan obes direkrut dan dibahagikan kepada dua kumpulan (kumpulan intervensi, n = 32 dan kumpulan kawalan, n = 32). Subjek dari kumpulan intervensi menerima program berjadual selama tiga bulan dan kumpulan kawalan menerima konsultasi mengenai pengurusan berat badan secara rutin daripada dietitian. Kesan kumpulan menunjukkan perbezaan signifikan terhadap ukur lilit pinggang (ULP) bagi lelaki ($p < 0.05$) dan Indeks Jisim Tubuh (IJT) bagi wanita ($p < 0.05$). Ukur lilit pinggang bagi subjek lelaki dari kumpulan intervensi didapati menurun sebanyak 3.4% (3.7 cm) berbanding kumpulan kawalan 0.7% (-0.8 cm). Subjek wanita dalam kumpulan intervensi menunjukkan peningkatan terhadap IJT mereka sebanyak 1.4% (-0.4 kg/m^2) berbanding kumpulan kawalan 0.3% (-0.1 kg/m^2). Aras kolesterol jumlah dan kolesterol LDL bagi wanita dalam kedua-dua kumpulan intervensi dan kawalan didapati menurun mengikut masa secara siginifikan ($p < 0.05$). Secara kesimpulannya, program pengurusan berat badan berstruktur adalah efektif dalam memperbaiki ULP bagi lelaki dan IJT bagi wanita, dan turut berkesan setara dengan diet kaunseling secara individu oleh dietitian dalam memperbaiki profil lipid bagi wanita.

Kata kunci: Obesiti; promosi kesihatan; program berstruktur; intervensi; tempat kerja

INTRODUCTION

Overweight and obesity is a global health problem, it has emerged as an epidemic in both developed and developing countries (National Health and Morbidity Survey II 1996; World Health Organization 2003) including Malaysia. The National Health and Morbidity Survey (NHMS) has reported that the prevalence of overweight increased from 16.6% (National Health and Morbidity Survey II 1996), 29.%1 (National Health and Morbidity Survey III 2006) and 29.4% (National Health and Morbidity Survey 2011), whereas obesity rates increased from year 1996 (4.4%), 2006 (14.0%) and 2011 (15.1%).

Overweight and obesity are associated with genetic, behavioural, social and economic also environment. Sedentary workplace has been suggested as a potentially hostile environment in terms of overweight and obesity (Mummery et al. 2005). Workplace is a sedentary setting

for many workers and a place where access to energy-dense food and beverage is common (Anderson et al. 2009). A total of 42.1% from the total population in Malaysia was employed (Statistic Department of Malaysia 2010). The third NHMS indicated that senior officers and managers group, and the technical and associate groups had the highest prevalence for overweight at 37.4% (National Health and Morbidity Survey III 2006). Besides jeopardizing health status, overweight and obesity may cause weight-based discrimination in employment (Roehling 1999) as it reduced workforce input and increased job limitation (Anderson et al. 2009). Overweight and obesity also increases the expenses related to absenteeism, sick leave, disability, pain, medical expenses, compensation and insurance premiums to employees (2006). Further, the overall health care cost including medical and pharmaceutical among obese and severely obese workers were higher compared to those of normal weight (Durden et al. 2008). In Malaysia, it was reported that 94.6% of the daily workforce lost was due to sick leave, followed by a delay (56.8%), visiting a clinic/ hospital (50%), industrial accident leave (35.1%) and prolonged illness (32.4%) (Malaysian Employers Federation 2010).

The Malaysian guideline for prevention of obesity also included workplace as one of the important setting in prevention of obesity (Mohd Ismail Noor 2005). Nevertheless, most of weight reduction intervention programmes at workplace only resulted in modest improvements on health outcomes (Hutchinson & Wilson 2012), as most of the studies involved both the normal and overweight employees, such as the one being conducted among security personnel at an academic based workplace (Moy et al. 2006). Achieving a healthy workplace intervention by involving diet and physical activity aspects not only results in improved health for individuals but also may bring benefits to employers and society (Ni Mhurchu 2010). Environmental intervention such as increased healthy food supply and food labelling at cafeteria alone (Holdsworth et al. 2004) or combination with health education (brochures and leaflets on healthy food, blood pressure and cholesterol) (Engbers et al. 2005) were showed to be effective in changing behavioural towards healthy eating. Besides, workplace physical activity interventions also may in turn improve health outcomes, work culture, and job stress (Conn et al. 2009). Thus, this study aimed to design and implement weight reduction programme at workplace targeting overweight and obese employees at a petroleum industry in the East Coast of Malaysia.

MATERIALS AND METHODS

STUDY DESIGN

This study was a quasi-experimental study to determine the effectiveness of a structured weight management programme at workplace for three months at a petroleum industry in the East Coast of Malaysia. The intervention group received a structured education and self-empowerment on diet, exercise and psychology aspects conducted by dietitians, physiotherapists and a clinical psychologist for 3 months. New patients referred to the dietitians at an outpatient diet clinic in a tertiary hospital were recruited as subjects in the control group. They received a routine individual consultation for weight reduction by dietitians at least in two visits during this study. Subjects were asked to complete self-administered questionnaires on sociodemography and dietary knowledge, attitude and practice (KAP) at baseline. Anthropometric and biochemical parameters from both groups were assessed at baseline and month three. The Medical Research and Ethics Committee of Universiti Kebangsaan Malaysia has approved this study and informed consent was obtained from subjects.

STUDY POPULATION AND SAMPLING

A total of 64 subjects (n = 32 intervention and n = 32 control) aged 18 to 59 years, Malaysians, able to communicate in Bahasa Malaysia and English, had a BMI of more than 24.9 kg/m² and had no known terminal or mental illness participated in this study. Subjects from intervention group were participants of FIT programme at the petroleum industry in the East Coast of Malaysia and the control group was conveniently selected from a list of new patients of the outpatients of diet clinic at the selected hospital. Intervention programme.

Intervention group was scheduled into a monthly comprehensive structured intervention programme for three months as shown in Table 1. The weight management programme was developed based on the Health Belief Model (HBM) that promote healthy body weight and to prevent obesity, as suggested by Rimer & Glanz (2005). This model is a good model in addressing problem behaviours that bring health concerns (Rimer & Glanz 2005). Group sessions were held monthly to disseminate information on dietary and physical aspects through talks and group counseling conduction by experienced dietitians and physiotherapists. Interactive sessions such as testing beverages for different sugar levels, estimate food calories and supermarket tour were carried out through the sessions. A single session of group exercise was conducted by the physiotherapists. The types of exercises included in the group exercise session were stretching exercises, strengthening exercises with minimal weights and aerobic exercises and tips for avoiding injuries were information had been taught throughout the session. The intensity of exercise recommendation was based on subjects' fitness level. Subjects were encouraged to do exercise in the gym during their protected time, together with additional exercises such as brisk walking, jogging or cycling during their leisure time. Upon discussions with the management, subjects were given protected time to exercise for an hour at least 3 times a week at the workplace supervised by in-house trainers. These exercise prescriptions were made

purposely to encourage the participants to improve their fitness level and increase their physical activity level. Discussions and negotiations were also conducted with the canteen operators for provisions of healthy meals and menus throughout the intervention programme. Control group received a routine individual consultation on weight management from a dietitian without any other intervention. Subjects' attendances at every session were monitored to evaluate the level of compliance.

ANTHROPOMETRIC AND BIOCHEMICAL MEASUREMENTS

Height without shoes was determined to the nearest 0.1 m with SECA Bodymeter (Germany) and weight was measured to the nearest 0.1 kg using a digital lithium weighing scale (Tanita 318, Japan). BMI was calculated as weight in kilogram of per square of height in meter (kg/m^2). Waist circumference was measured using flexible measuring tape to the nearest 0.1 cm. All anthropometric measurements were measured twice to minimise measurement error by using standard method (ISAK 2006). Furthermore, the measurements were taken by a trained dietitian. A total of 10 ml fasting venous blood samples were taken at baseline and month-3 to determine selected biochemical assessments including fasting blood sugar (FBS), HbA1c, total cholesterol, LDL-C, HDL-C, triglycerides, and total cholesterol to HDL ratio. The analysis was done at Pathology Laboratory (M) Sdn. Bhd., Terengganu for intervention group and Chemical Pathology Unit in the selected hospital for the control group.

TABLE 1. Scheduled activities for the intervention group

Month	Duration (hours)	Programme
Month 0	2	PRE VISIT Opening speech of the programme - Distribution of questionnaires
Month 1	2	Baseline anthropometric measurements
	3	Diet talk, motivational talk and question and answer session
	2	Group dietary counselling
	4	Fitness assessment and exercise prescription
	2	Training the trainers for in-house gym trainers
Month 2	4	SUPERMARKER TOUR & SWEEP Education on how to read food label and choose healthier food choices
Month 3	4	CALORIE TRACKER & CALORIE MAZE Subjects learned to estimate calorie of local food and compare calorie content of food with different cooking methods

TABLE 2. Baseline characteristics of subjects in the control and intervention groups [Present as n (%)]

Characteristics	Parameters	Control Group (n = 32)	Intervention Group (n = 32)
Gender	Men	16 (50.0)	16 (50.0)
	Women	16 (50.0)	16 (50.0)
Ethnicity	Malays	32 (100.0)	32 (100.0)
Age (year)	19-25	2 (6.3)	3 (9.4)
	30-59	30 (93.7)	29 (90.6)
Education Level	Primary/Secondary School	22 (68.7)	16 (50.0)
	Degree/Postgraduate	6 (18.7)	11 (34.4)
	Others	4 (12.5)	5 (15.6)
Marital Status	Single	1 (3.1)	5 (15.6)
	Married	31 (96.9)	27 (84.4)
Household income	< RM 1500	3 (9.4)	1 (3.2)
	RM 1500-RM 3500	14 (43.8)	10 (31.2)
	RM 3500-RM 5000	5 (15.6)	8 (25.0)
	> RM 5000	10 (31.2)	13 (40.6)

NS- non significant using Chi-square test
RM-Ringgit Malaysia

NUTRITION KNOWLEDGE, ATTITUDES AND PRACTICES (KAP) ASSESSMENT

Questionnaire on KAP was the instrument developed and validated by the Cardiovascular Intervention Group Study MOH-UIA-UKM-UM-UPM-USM-1998 (Norimah 1997; Norimah & Margetts 1997; Maisarah 1999) and used to assess subjects' nutrition knowledge, attitudes and practices. KAP consisted of 46 questions which included knowledge of balanced diet, healthy eating, food pyramid, food group and food to be consumed most and least, food which were rich sources of energy, carbohydrate, protein, fat, vitamins, minerals, fibre, cholesterol and sodium. There were also questions on food preparation, effect of excessive energy and sugar intake, importance of exercise and ways to maintain desirable body weight. Most of the questions were multiple-choice questions, with a few open ended questions. One mark was given to every corrected response while no mark to incorrect or unsure response for nutrition knowledge questions. The scores were categorized as poor (0-50%), moderate (51-74%) and good (> 75%) (Norimah & Margetts 1997). Likert scale (1932) was used in scoring for nutrition attitude and practice.

STATISTICAL ANALYSES

Data were analysed using the 'Statistical Package for Social Sciences' (SPSS) version 17.0, with statistical significance set at $p < 0.05$ using two sided tests. This study was designed to have 80% power to detect a difference when there is a real difference and maximum variability is 50% (0.5). The Kolmogorov-Smirnov test was used to test the data normality. Normal distribution data was analysed by using parametric test. Non-parametric test was used to analyse data that was not normally distributed. Baseline difference was tested using an independent sample t-test. In order to estimate the effectiveness of the intervention, analysis of variance (ANOVA) and analysis of covariance (ANCOVA) test were applied for comparison between results of baseline and month three, with age, income and KAP levels and selected biochemical parameters at baseline were included as covariates.

RESULTS

BASELINE CHARACTERISTICS

There were thirty-two subjects (16 men and 16 women) in both groups with 0% dropouts at the end of the study. All subjects were Malays. The mean age of men in control and intervention group was 41.6 ± 10.7 and 37.7 ± 9.7, years old, respectively. The corresponding figures in women in intervention group was 44.1 ± 8.3 and control group, 38.9 ± 6.4 years old years old, respectively. There was no significant difference between age in both groups ($p > 0.05$). As shown in Table 2, most of subjects in both control and intervention group had a household income of RM1500-RM3500 (31.2% vs 42.8%) and > RM5000 (40.6% and 31.2%). There was no significant difference in sociodemographic profiles between groups.

NUTRITION KNOWLEDGE, ATTITUDES AND PRACTICES (KAP) ASSESSMENT

Mean score of KAP at baseline of intervention group was higher (77.6 ± 9.4%) than the controls (61.0 ± 15.7%) ($p < 0.05$). Majority of subjects in the intervention group were categorized as having "good" KAP (62.5%), followed by "medium" KAP (37.5%) and 0% for "poor" KAP. However, in control group, more than half of subjects had "medium" KAP (53.1%), followed by "poor" KAP (25%) and "good" KAP only 21.9% (Figure 1).

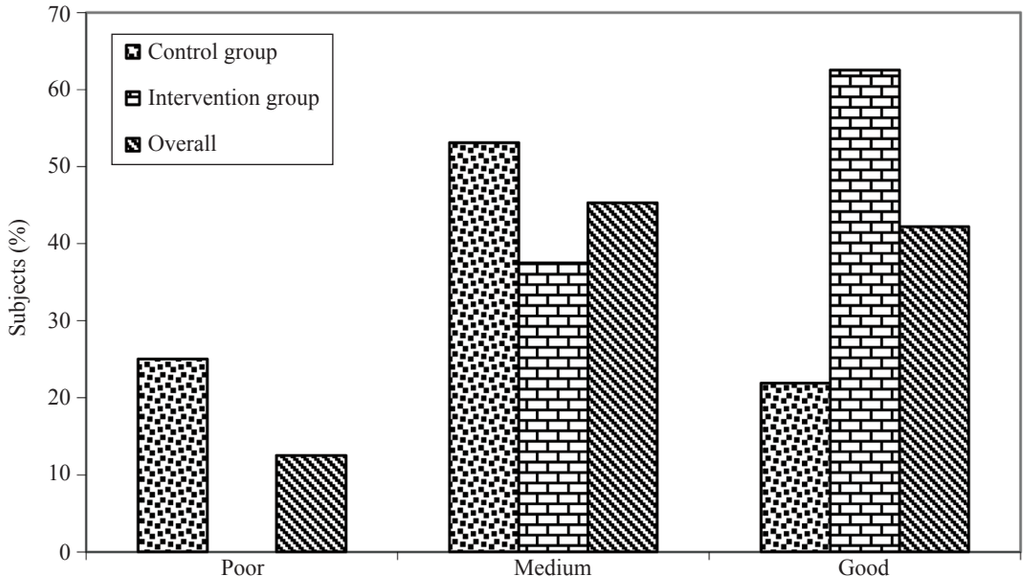

FIGURE 1. Distribution of mean score of KAP (%) of subjects at baseline according to study groups

EFFECTIVENESS OF THE INTERVENTION PROGRAMME ON ANTHROPOMETRIC PROFILE

There was a significant group effect on mean waist circumference among men ($p < 0.05$), with the intervention group showed a reduction by 3.4% (-3.7 cm) as compared to controls 0.7% (-0.8 cm) with medium effect size (medium partial eta squared = 0.205) throughout the 3 months intervention programme (Table 3). Similar trend was observed for body mass index (BMI) among women. There was a significant group effect ($p < 0.05$), of which BMI reduced by 1.4% (-0.4 kg/m^2), as compared to controls with a reduction of 0.3% (-0.1 kg/m^2) (Table 3).

EFFECTIVENESS OF THE INTERVENTION PROGRAMME ON BIOCHEMICAL PROFILE

There were no significant changes in biochemical profiles among men throughout the intervention period. However, there was a significant time effect on total cholesterol and LDL cholesterol levels among women, of which both groups showed reductions in the levels throughout the 3 months period ($p < 0.05$, time effect). The percentage of changes of total cholesterol for intervention and control groups were -7.4% (-0.4 mmol/l) and -7.3 % (-0.3 mmol/l), respectively. The corresponding figure for LDL cholesterol level was -8.3% (-0.3 mmol/l) for both groups. Large effect size for both reductions [partial eta squared = 0.224; 0.356] was noted.

TABLE 3. Mean ±SD of anthropometry data of subjects according to study groups and gender at baseline and third month

Parameter	Control group Mean ± SD		Intervention group Mean ± SD		Analysis of covariances[a] *p* (Partial Eta Squared)		
	Baseline	Third Month	Baseline	Third Month	Group effect	Time effect	Interaction of group and time
Weight (kg)							
Men (*n* = 16)	88.5 ± 20.3	87.7 ± 19.8	97.2 ± 20.6	98.0 ± 21.7	0.235 (0.061)	0.847 (0.002)	0.225 (0.063)
Women (*n* = 16)	72.4 ± 8.5	72.3 ± 8.7	67.3 ± 6.1	66.4 ± 7.3	0.088 (0.097)	0.680 (0.006)	0.476 (0.018)
BMI (kg/m^2)							
Men (*n* = 16)	31.9 ± 1.1	31.8 ± 5.5	33.1 ± 5.9	33.5 ± 6.4	0.697 (0.007)	0.852 (0.002)	0.480 (0.022)
Women (*n* = 16)	30.2 ± 3.3	30.1 ± 3.2	28.7 ± 1.8	28.3 ± 2.2	*0.031 (0.150)	0.662 (0.007)	0.474 (0.018)
Waist circumference							
Men (*n* = 16)	103.4 ± 15.1	102.7 ± 14.6	109.9 ± 12.8	106.2 ± 14.7	*0.020 (0.205)	0.634 (0.010)	0.172 (0.080)
Women (*n* = 16)	93.9 ± 10.7	93.0 ± 10.1	91.9 ± 8.2	92.9 ± 10.2	0.159 (0.067)	0.323 (0.034)	0.308 (0.036)

[a]Baseline KAP as covariate
*$p < 0.05$, repeated measure ANOVA

DISCUSSION

In this study, the three months weight management programme at workplace had successfully improved the anthropometric parameters (i.e. waist circumference in men and BMI in women). These findings were in agreement with an earlier systematic review at workplace based on ecologic intervention that concluded such intervention programmes were successful in preventing weight gain among employees who engaged with the offered intervention (Maisarah 1999). Furthermore, structured programmes (scheduled sessions) have been reported to be more effective than unstructured approaches (Anderson et al. 2009). Health promotion strategies consists of a combination of education or information and behavioural modification approaches, such as adopted in the present FIT programme, appeared to be more effective than providing information alone (Jovanović et al. 2009). The reduction in waist circumference among men from the intervention group as noted in this study was consistent with findings from previous studies (Mummery et al. 2005; Anderson et al. 2009). Reduction in waist circumference is an important early step to improve the biochemical profile including blood glucose, lipid and blood pressure (Culos-Reed et al. 2007).

The weight reduction that results in improved BMI among women in the present study was in line with earlier findings that intervention programme at workplace has moderate effect on weight (Heshka et al. 2003; Gemson et al. 2008; Miyatake et al. 2008). The weight reduction of -0.9 kg and -0.4 kg/m^2 for BMI throughout three months period in the intervention group was closed to the estimation of weight loss of approximately 1.0 kg and BMI reduction of 0.5 kg/m^2 (Heshka et al. 2003). However, it should be noted that there was no significant changes for body weight among men, although the WC improved. Body weight is a gross indicator of body size, which is not able to differentiate between body fat and muscle mass. There is a need to include a details measurement of body composition in future studies.

There was no significant difference on biochemical profile among men which might be due to the non-significant changes in weight. It is important to note that HDL-C level will only increase when weight loss occurs

TABLE 4. Biochemical profile of subjects according to intervention groups and gender at baseline and 3 months

Parameter	Control group Mean ± SD		Intervention group Mean ± SD		Analysis of covariances[a] *p* (Partial Eta Squared)		
	Baseline	3 Months	Baseline	3 Months	Group effect	Time effect	Interaction of group and time
Fasting blood glucose (mmol/l)							
Men (*n* = 16)	7.4 ± 3.3	6.4 ± 2.3	5.8 ± 2.6	6.2 ± 3.5	0.271 (0.042)	0.175 (0.678)	0.202 (0.055)
Women (*n* = 16)[b]	6.9 ± 3.3	6.4 ± 2.5	4.7 ± 0.5	4.6 ± 0.5	0.234 (0.056)	0.414 (0.027)	0.696 (0.006)
HbA1c (%)							
Men (*n* = 16)	6.9 ± 2.2	6.7 ± 1.9	6.3 ± 2.0	6.7 ± 2.6	0.752 (0.003)	0.742 (0.004)	0.765 (0.003)
Women (*n* = 16)[b]	6.6 ± 2.0	6.1 ± 1.4	5.5 ± 0.4	5.4 ± 0.5	0.673 (0.007)	0.359 (0.034)	0.998 (0.000)
Fasting serum lipid (mmol/l)							
Total Cholesterol							
Men (*n* = 16)	5.3 ± 1.0	5.1 ± 0.8	5.7 ± 1.1	5.4 ± 1.2	0.393 (0.025)	0.882 (0.001)	0.746 (0.004)
Women (*n* = 16)[b]	5.5 ± 1.6	5.1 ± 1.3	5.4 ± 0.5	5.0 ± 0.4	0.810 (0.002)	*0.015 (0.224)	0.668 (0.008)
HDL-cholesterol							
Men (*n* = 16)	1.3 ± 0.7	1.2 ± 0.7	1.3 ± 0.1	1.2 ± 0.2[b]	0.313 (0.035)	0.841 (0.001)	0.430 (0.022)
Women (*n* = 16)[b]	1.2 ± 0.7	1.4 ± 0.5	1.5 ± 0.3	1.4 ± 0.2	0.303 (0.042)	0.439 (0.024)	0.169 (0.074)
LDL-cholesterol							
Men (*n* = 16)	3.0 ± 1.2	3.1 ± 0.9	3.6 ± 0.9	3.3 ± 1.1	0.216 (0.052)	0.375 (0.027)	0.912 (0.000)
Women (*n* = 16)[b]	3.6 ± 1.3	3.3 ± 0.8	3.6 ± 0.9	3.3 ± 0.5	0.915 (0.000)	**0.001 (0.356)	0.509 (0.018)
Triglyceride							
Men (*n* = 16)	1.8 ± 0.9	1.7 ± 0.8	1.8 ± 0.8	1.8 ± 0.8	0.866 (0.001)	0.997 (0.000)	0.837 (0.001)
Women (*n* = 16)[b]	1.6 ± 1.0	1.8 ± 1.3	0.9 ± 0.3	0.9 ± 0.3	0.406 (0.028)	0.871 (0.001)	0.646 (0.009)
Ratio of total cholesterol to HDL-cholesterol							
Men (*n* = 16)	4.7 ± 1.4	4.7±1.4	4.5±0.9	4.6±1.0	0.727 (0.004)	0.958 (0.000)	0.812 (0.002)
Women (*n* = 16)[b]	4.7±1.4	4.2±1.6	3.8±0.7	3.8±0.6	0.389 (0.030)	0.821 (0.002)	0.861 (0.001)

[a]Baseline KAP as covariate; [b]Baseline biochemical as covariate; *p < 0.05, **p < 0.01, repeated measure ANOVA

(Hersey et al. 2008). Desirably, the weight management programme at workplace in the present study was as effective as individual diet counselling sessions in a health care setting in improving lipid profiles (i.e. total cholesterol, LDL-C) in women. The significant reduction of total cholesterol level by -0.4 mmol/l was consistent with other workplace intervention study that achieved a reduction of -0.38 mmol/l of total cholesterol level throughout three months period (Nakanishi et al. 2000). The reduction of LDL cholesterol by (-0.3 mmol/l) was desirable and consistent with a previous large scale local study on nutrition intervention at workplace over a 3 years follow period (Moy et al. 2006). Further, a reduction of 1% of total cholesterol level will reduce the risk of coronary heart disease by 2% (Shalitin et al. 2009). In the present study, the weight management programme at workplace showed a greater effect on women subjects as compared to men. This observed outcome was probably due to the fact that women were more committed and motivated in allocation to the entire planned programme (Catapano 2009). This is rather an interesting finding since most of the studies on weight management programme at workplace were carried out among men (Fager & Wiklund 1997; Webber et al. 2010).

Nevertheless, this study had some limitations. First subjects in control group were outpatients of diet clinic which might has different nature of work. However, the two groups were comparable for sociodemographic profiles, i.e. age, mean household income and body weight at baseline. Secondly, there was relatively small sample size of each group; and subjects consist of predominantly Malays, therefore, it is not possible to generalize study findings to other ethnic groups. It should also be noted that most of the significant findings were group effect with no interaction effect, indicating that a larger sample and a longer intervention period were required to detect significant findings. Further, some of the changes noted such as total and LDL-C provided large effect size as measured using eta square value indicating the chances of significant intervention effect if the sample size is increased. Future studies should also consider emphasizing more on motivation components and embarking on randomized controlled trial as suggested by a recent meta-analysis of interventions studies at work place (Hutchinson & Wilson 2012).

Despite all the limitations, the study has able to demonstrate the feasibility of a structured weight management programme at workplace among Malaysian employees, of which such a programme could be adopted to combat the obesity epidemic.

CONCLUSION

The three month structured weight management programme at workplace has successfully improved the anthropometry parameters (i.e. waist circumference in men and BMI in women), as compared to individual diet counselling in health setting, conducted among overweight and obese individuals. It is also found to be as effective as individual diet counselling in improving the lipid profile among women subjects. A longer period of intervention should be planned and there is a need to assess the sustainability of such weight management programme at workplace in promoting weight loss and behavioural changes among employees with weight problems.

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