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Original Article

The Effects of Exercise Program on Burnout and Metabolic Syndrome Components in Banking and Insurance Workers

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Abstract: To explore the effectiveness of exercise program for banking and insurance workers and clarify the association between exercise, burnout, and metabolic syndrome components. In the process of the study, a practicable worksite exercise program was developed for bank and insurance enterprises. A three-month (12-wk) exercise course was conducted, and its benefits evaluated. Levels of burnout and metabolic syndrome components were analyzed after exercise intervention. After intervention, the indicators of burnout and metabolic syndrome components were significantly improved in both low and high intensity groups, and the improvement were expressed in reduction of waist circumference, systolic blood pressure, person burnout and work-related burnout. A dose-response of burnouts and metabolic syndrome components with exercise intensity are shown (p<0.05). Metabolic syndrome components were independently associated with burnout and exercise intensity in the crude model. After adjustment for potential confounders, waist circumference and systolic blood pressure differences showed significant associations with exercise intensity (p<0.05). This study demonstrated an effective approach to worksite exercise intervention and exercise intensity played an important role to alleviate damage between burnouts and metabolic syndrome components.

Key words: Exercise intervention, Job stress, Burnout, Metabolic syndrome components, Work environment

Introduction

Metabolic syndrome increases the risk for morbidity and mortality from cardiovascular disease[1, 2]. Features of metabolic syndrome are composed with five risk factors, including low high-density lipoprotein cholesterol (HDL) concentration, high triglyceride (TG), elevated blood pressure, impaired glucose tolerance, and central obesity[3]. Along with the prevalence of the metabolic syndrome increase in worldwide population, the prevalence rate in Taiwan is also increasing[4, 5]. According to reports of employment conditions and health inequalities from the WHO, the world employment to population ratio has reached above 60%[6] and the high prevalence of metabolic syndrome impacts human resources and work productivity.

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Job stress has been recognized as a risk factor that affects the development of metabolic syndrome, as caused by negative changes in the workplace and is referred to as the harmful physical and emotional responses that occur when workers are incapable of fulfilling their job requirements[7–12]. Previous studies have indicated that the mechanism of work stress is associated with increased risks for cardiovascular diseases[8–10]. A recent study has revealed that job stress has an interactive effect on the relationships between metabolic syndrome factors and renal dysfunction in Japanese male white-collar employees[11]. Further, occupational cardiovascular, cerebrovascular, and mental disorders attributed to work stress were increasingly compensated for, in Japan, Korea, and Taiwan from 1980 to 2010[12]. The effects of burnout and perceived stress on hypothalamic pituitary adrenal (HPA) axis regulation have been identified in past study[13]. The chronic stress-related activation of the HPA axis created disturbances in circadian rhythms related to cortisol and increased insulin resistance. This, in turn, particularly affected metabolic-highly active tissues and triggered the development of metabolic syndrome along with an unhealthy lifestyle[9, 10, 13, 14]. Burnout is considered as a specific kind of job strain that has a combination of physical fatigue and emotional exhaustion (anxiety, disinterest, and impatience)[15, 16]. Burnout is related to higher absenteeism that produces extraneous expenses in workplace[17]. Accumulating researches has addressed burnout creates negative health outcomes which increased risk of cardiovascular disease and diabetes[18, 19]. On the other hand, according to Kivimaki *et al.*, a demand-control model was used to determine job strain and the effect on health and well-being. The study found job strain (high job demand and low job control) was associated with the risk of cardiovascular disease[20]. Several studies found that high job strain was related to a greater risk of coronary heart disease (CHD) and related risk factors[21, 22]. Numerous studies have demonstrated a particularly significant correlation between blood pressure and job stress[23, 24].

Conventionally, physical activity is considered a fundamental factor in the treatment and prevention of cardiovascular diseases. Several findings have suggested that effective physical activity intervention contribute to public health[25, 26]. Numerous studies have also demonstrated that supervised dietary and exercise intervention in a controlled environment have salutary effects on cardiovascular disease risk factors[27, 28]. Conversely, the rationale for carrying out physical activity as an intervention to reduce stress remains controversial. Previous reviews have concluded that physical activity produces beneficial adaptations in stress pathways that buffer the harmful effects on health, while the physical activity-induced adaptation is considered a psychosocial stressor response that interferes with the potential of reduced harm[29]. The association of exercise, job stress, and metabolic syndrome still remains unclear[30–33]. Since burnout is negative work-related state of feelings which creates negative influences of prolonged job stress[34], we conceptualized burnout as a job strain factor correlates with metabolic syndrome components. Our study hypothesizes that physical activity is an intervention factor that affects the relationship between burnout (job stress) and metabolic syndrome components. Therefore, a practical exercise program was conducted to alleviate the damage done by burnout in banking and insurance workers. The purpose of the present study was to estimate the effects of exercise and to clarify the role played by exercise in this relationship.

Subjects and Methods

Study design and participant selection

According to research by the Institute of Occupational Health and Safety in Taiwan, financial industries (banking and insurance) involve high levels of work stress and have work-related burnout[35]. This study was conducted at two banks and one insurance company in Taipei, Taiwan between May and December 2009. These two banks were domestic banks in Taiwan that possessed over 130 branches and ranged between 4,500 to 7,000 workers. The insurance company was a worldwide firm that has seven offices (1 headquarter and 6 local branches) with 650 workers in Taiwan. The subjects were recruited from one bank headquarter (1,200 workers), one local branch of bank (40 workers), and one insurance headquarter (250 workers). Most of the subjects (70%) were office administrators with the other job categories as financial consultants, technical support, and department managers. An orientation was given to raise the awareness of healthy lifestyles related to stress and concepts of regular exercise and proper diet. During the orientation, all subjects were invited to join our three-month (12-wk) exercise program with the setting of 30 to 40 participants in each sub-group (control, low-intensity, and high-intensity sub-groups). The exercise program was administered after work in assigned open areas where the volunteer subjects worked. There were 109 workers in the orientation that agreed to join the study program and voluntarily assigned into three different exercise groups. The control group consisted of 38 workers, the low-intensity group consisted of 36 workers, and the high-intensity group consisted of 35 workers. After exercise intervention, 89 workers completed the intervention requirement including the pre- and post-questionnaires, the pre- and post-metabolic syndrome measurements, and the three-month exercise program. The other 20 workers which 8, 5 and 7 workers from control, low and high intensity groups were excluded for: falling ill, quitting, and not able to fully complete in the intervention because of a busy work schedule. The protocol for this study was approved by the Taipei Medical University institutional review board, and written informed consent was obtained from all of the participants.

Exercise protocol

The exercise program was developed using techniques of gymnastics designed for office worker (15 min), aerobic exercise (30 min), and stretching (15 min). The gymnastics program was designed by the Institute of Occupational Safety and Health in Taiwan to increase muscle strength, to induce metabolic rates for workers with sedentary lifestyle, and for use in cardiovascular disease studies[36]. A 30-min. High-Low impact aerobic class was led by a professional trainer who used music (130–140 beats per minute) to increase participant cardiopulmonary endurance. Stretch training consisted of using Yoga and Pilates (body conditioning technique) to improve body flexibility. The exercise program was implemented for a period of 12 wk with one hour of exercise two times a week. The intervention of the exercise was divided into three levels by group (control, low-, and high-intensity groups) to compare the effects for each level of participation. The volunteer subjects were pooled into three different exercise categories:

1. Control group: participants planned and carried out exercise regimes on their own.
2. Low-intensity group: participants were assigned to attended one exercise session per week.
3. High-intensity group: participants were assigned to attend two exercise sessions per week.

Job strain measurement

A standardized self-administered questionnaire was designed to collect demographic data, including age, sex, marital status, level of education, and other lifestyle information. All the participants completed the questionnaire pre- and post-intervention. The Chinese versions of the Job Content Questionnaire (C-JCQ) and Copenhagen Burnout Inventory (C-CBI) were partially used to identify the intensity levels of job strain[37, 38]. The indicators of job demand, job control (decision latitude), work-related, and personal burnout (physical and psychological fatigue and exhaustion) were conceptualized as levels of job strain. C-JCQ and C-CBI had 5 domains and 27 items: 8 items for job demand, 9 items for job control, and 5 items each for work-related and personal burnout with higher scores of job demand, work-related, and personal burnout representing elevated intensity of job strain. Lower scores of job control represent elevated intensity of job strain. Detail information regarding psychometric properties, subscales, items, and calculation formula are found in previous studies[37, 38].

Metabolic syndrome components measurement

The components of metabolic syndrome measured were serum concentrations of fasting blood glucose, triglycerides, and cholesterols along with blood pressure and waist circumference. All of blood samples were taken by trained nurses and analyzed at professional medical center. Resting blood systolic/diastolic pressure was measured with a digital sphygmomanometer after a 5-min period of rest and waistlines were measured using a tape measure at the smallest circumference of a natural waistline (just above the belly button). All measurements were taken during the morning after an overnight fasting period of 8 h. The metabolic syndrome components were determined by standards established by the Department of Health in Taiwan, including elevated waist circumference (>80 cm females, >90 cm males), elevated blood pressure (130/85 mmHg), elevated fasting blood glucose (>100 mg/dL), elevated plasma triglyceride concentrations (>150 mg/dL), and reduced high-density lipoprotein cholesterol concentration (<50 mg/dL in females, <40 mg/dL in males)[39].

Statistical analysis

Baseline demographic data, and basic attributes were examined using descriptive analysis for exercise effect differences. After intervention, the repeated measures analysis of variance (ANOVA) was conducted on outcome variables for significance of differences in group (level of groups), period (pre, and post), and their interaction (group × period). Significant interactions were examined by post hoc Tukey Honestly Significant Difference (HSD) test to determine if effects of pre- and post-differences were different between three sub-groups. Further, the job strain indicators were identified as independent variables, metabolic syndrome components were identified as dependent variables; and the exercise program was regarded as the intervention factor. We tested confounders such as demographic characteristics, job characteristics, and health behavior for various covariates. The relationships between job strain, metabolic syndrome components, and exercise were established when job strain affected the metabolic syndrome components through the modified effects of exercise. In the simple linear regression analysis, independent variable, intervention factor, and confounder were first used independently to determine the effects on metabolic syndrome components. In addition, multiple regression was conducted to clarify the relationships of job strain and exercise on metabolic syndrome components with adjusted potential confounders. Data collection was done with Microsoft Excel and all analyses were done with SPSS statistical software (version 18.0).

Results

Comparison of baseline demographic variables

Our exercise program provided three levels of exercise intensity groups. In the control group, each participant was instructed to keep their past exercise regimen, or plan out their new exercise regimen. In the low and high intensity groups, each participant was instructed to join low intensity 12 times or high intensity 24 times of exercise practices and the average frequency of exercise participation in low and high intensity groups were 7 and 18 times. Table 1 shows baseline data for participants including demographic characteristics, job characteristics, and health behavior. Most of the baseline variables evidenced no significant differences in distribution between the three sub-groups except for age (p=0.001), sex (p=0.003), and job category (p=0.003). The majority of participants graduated from university with a salary range of $100,001 to $1,000,000 NTD per year. Participants without regular exercise and in the office administration job category have shown more desire to join the exercise program. A large proportion of females and older subjects tended to participate in the higher-intensity sub-group. Further, higher level of job category (manager or above) has tendency to choose control group rather than exercise group.

Exercise effects on job strain and metabolic syndrome components

Table 2 presents the effects of exercise on job strain indicators and metabolic syndrome components. After the 12-wk exercise program, personal burnout, work-related burnout, job demand, and waist circumference showed significant improvement within three levels of group. The exercise effects also showed significant differences between three levels of group for the indicators of personal burnout, work-related burnout, and job demand. Further, a similar outcome was found in group by period interaction for the indicators of personal burnout (F=3.46, p=0.036), work-related burnout (F = 3.46, p=0.048), waist circumference (F=8.05, p=0.001), and systolic blood pressure (F=11.39, p<0.001). In the Table 3, the comparison of pre-post difference between three sub-groups was showed that the post-effect differences of personal burnout (p=0.031), waist circumference (p<0.001), and systolic blood pressure (p<0.001) decreased significantly with high intensity group than control group. High intensity group also decreased their systolic blood pressure better than low intensity group (p=0.006).

Relationship of independent variables and metabolic syndrome components

Table 4 indicates the association between independent variables and metabolic syndrome components. In the regression model, waist circumference and systolic blood pressure differences have significantly associated with the variables of exercise intensity, and high level of exercise intensity had reduced waist circumference and systolic blood pressure by 2.6 cm and 8.8 mmHg, respectively. Positive correlations between metabolic syndrome component and job strain indicator were also found after 12 wk, as personal and work-related burnout differences reduced the systolic blood pressure difference by 0.2 and 0.3 mmHg significantly. In addition, demographic characteristics have significant effects on waist circumference difference and included the variables of age, sex, and marital status.

Relationship of exercise, burnout and metabolic syndrome components

Tables 5 and 6 presents results of multivariate regression analysis for adjusted impact of metabolic syndrome components after 12-wk exercise program. The results found that both intensity sub-groups had significant effects on waist circumference and systolic blood pressure differences with an adjustment for the covariant variables (age, sex, and marital status) (p<0.05). The high-intensity subgroup had a significant decrease in waist circumference and systolic blood pressure (3.23 cm and 13.44 mmHg) and the low-intensity sub-group had a significant decrease in waist circumference and systolic blood pressure (2.43 cm and 7.81 mmHg). The indicators of burnout did not show an impact on metabolic syndrome components when considering the covariant factors in the analysis model.

Table 1. Baseline data of participants

Variables		Control (n=29)		Low intensity (n=30)		High intensity (n=30)		$p^{\dagger}$
		number	%	number	%	number	%	
Demographic characteristics								
Sex	male	10	35	11	37	3	10	0.003*
	female	19	65	19	63	27	90	
Age		33.3 ± 9.4#		34.8 ± 7.0		41.0 ± 7.2		0.001*
Marital status	married	12	41	15	50	21	70	0.14
	unmarried	17	59	14	47	8	27	
	divorce	0	0	1	3	1	3	
Education	High school	5	17	8	27	10	33	0.68
	University	20	69	19	63	16	53	
	Master or above	4	14	3	10	4	14	
Job characteristics								
Job category	Manager or above	4	14	1	3	3	10	0.003*
	Technical support	0	0	4	13	0	0	
	Financial consultant	5	17	2	7	1	3	
	Banking or office administration	19	66	19	64	25	84	
	Other	1	3	4	13	1	2.8	
Salary	≤$100,000	3	10	1	3	1	4	0.91
	$100,001~500,000	8	28	11	37	9	30	
	$500,001~1,000,000	11	38	12	40	13	43	
	≥1,000,001	6	21	4	13	6	20	
	Unknown	1	3	2	7	1	3	
Job stressor	Job control	50.6 ± 11.2		48.7± 15.8		53.8 ± 13.8		0.35
	Job demand	64.2 ± 13.5		56.5 ± 14.7		59.1 ± 14.2		0.11
Health behavior								
Exercise Habit	Yes	15	52	9	30	13	43	0.23
	No	14	48	21	70	17	57	
Regular high fiber intake	3 meals per day	1	3	1	3	2	7	0.68
	At least 2 meals per day	4	14	6	20	10	33	
	At least 1 meals per day	23	80	21	70	17	57	
	None	1	3	2	7	1	3	
Smoking status	Yes or In the past	3	10	3	10	2	7	0.88
	No	26	90	27	90	28	93	
Daily alcohol drinking	Yes	1	3	2	7	1	3	0.71
	No	28	97	28	93	29	97	
Metabolic syndrome								
	Yes	3	10	1	3	2	7	0.56
	No	26	90	29	97	28	93	

Mean ± SD. *$p < 0.05$. †Significant difference according to ANOVA test for means or χ^2 test for frequencies. Control group: participants planned and carried out exercise regimes on their own. Low-intensity group: participants were assigned to attended one exercise session per week. High-intensity group: participants were assigned to attended two exercise sessions per week.

Discussion

Our exercise program has effectively improved the indicators for job strain and metabolic syndrome components (Table 2). The overall post exercise effects on personal burnout, job demand, and waist circumference were significantly reduced after intervention and personal burnout, work-related burnout, and job demand were significantly different between three levels of intensity groups. The exercise intensity (group effects) has interaction with exercise effect (period effect) for the indicators of personal burnout, work-related burnout, waist circumference, and

Table 2. Determinants of intervention effects on job strain indicators and metabolic syndrome components among three intensity groups

Variables	Control (n=29)		Low intensity (n=30)		High Intensity (n=30)		Group X Period Interaction	
	Pre	Post	Pre	Post	Pre	Post		
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	*F value*	*p value*
Job strain (score)								
Personal Burnout	48.8 ± 19.5	51.0 ± 20.3	46.2 ± 17.3	41.5 ± 14.9	42.2 ± 22.0	34.3 ± 15.4†‡	3.46	0.036*
Work-related Burnout	44.5 ± 15.4	48.0 ± 15.7	39.1 ± 14.0	35.9 ± 9.7	36.0 ± 16.6	33.1 ± 13.1†	3.46	0.048*
Job control	50.7 ± 11.2	50.4 ± 10.9	48.7 ± 15.8	52.1 ± 11.8	53.8 ± 13.8	54.3 ± 11.7	1.36	0.263
Job demand	64.2 ± 13.4	62.6 ± 11.8	56.4 ± 14.8	55.5 ± 13.9	59.0 ± 14.3	52.7 ± 13.4†‡	1.78	0.174
Metabolic syndrome								
Waist circumference (cm)	73.9 ± 9.2	74.5 ± 9.4	79.9 ± 11.1	75.5 ± 11.1	75.9 ± 9.8	73.0 ± 8.2‡	8.05	0.001*
Systolic blood pressure (mmHg)	116.0 ± 15.1	121.9 ± 13.5	122.5 ± 12.9	119.6 ± 13.4	121.5 ± 14.2	114.3 ± 12.9	11.39	0.000*
Diastolic blood pressure (mmHg)	76.0 ± 12.5	76.7 ± 10.7	76.4 ± 10.8	75.9 ± 10.8	75.8 ± 8.9	73.3 ± 8.2	0.723	0.488
High-density cholesterol (mg/dl)	59.2 ± 12.5	57.3 ± 12.0	59.4 ± 13.8	61.2 ± 13.3	58.6 ± 13.7	60.0 ± 16.0	1.31	0.277
Fasting glucose (mg/dl)	82.6 ± 15.8	88.2 ± 29.1	79.5 ± 9.4	78.3 ± 10.5	81.7 ± 6.9	79.7 ± 7.9	1.85	0.163
Triglyceride (mg/dl)	99.9 ± 63.4	88.9 ± 41.6	92.4 ± 46.7	99.7 ± 58.3	95.5 ± 67.0	93.9 ± 46.5	2.28	0.109

*$p<0.05$. †Repeated-measure ANOVA for group effect (control, low and high intensity group), $p<0.05$. ‡Repeated-measure ANOVA for period effect (pre- and post exercise), $p<0.05$. Control group: participants planned and carried out exercise regimes on their own. Low-intensity group: participants were assigned to attended one exercise session per week. High-intensity group: participants were assigned to attended two exercise sessions per week.

Table 3. Significant pre- and post-differences of three sub-groups for Tukey Honestly Significant Difference (HSD) test for job strain and metabolic syndrome indicators

Variables	Comparsion	X_1	X_2	$X_1–X_2$	*p value*
Personal burnout	High intensity vs Control group	7.9	–2.2	10.1	0.031*
	Low intensity vs Control group	4.7	–2.2	6.9	0.189
	High intensity vs Low intensity	7.9	4.7	3.2	0.689
Work-related burnout	High intensity vs Control group	2.9	–3.5	6.4	0.088
	Low intensity vs Control group	3.2	–3.5	6.7	0.074
	High intensity vs Low intensity	2.9	3.2	–0.3	0.996
Waist circumference	High intensity vs Control group	2.9	–0.6	3.5	0.000*
	Low intensity vs Control group	4.4	–0.6	5	0.059
	High intensity vs Low intensity	2.9	4.4	–1.5	0.211
Systolic blood pressure	High intensity vs Control group	7.2	–5.9	13.1	0.000*
	Low intensity vs Control group	2.9	–5.9	8.8	0.272
	High intensity vs Low intensity	7.2	2.9	4.3	0.006*

*$p<0.05$. X=mean value for each group pre-post difference.

systolic blood pressure. Further, high intensity group had greater improvements of pre-and post-exercise difference for the indicators of personal burnout, work-related burnout, waist circumference, and systolic blood pressure (Table 3). Exercise intensity is still considered as a factor that effects the variations of job strain indicators and metabolic syndrome components with other covariant factors has not included in these results. Our findings have shown that a 12-wk of exercise program releases the tension of personal and work-related burnout as waist circumference and systolic blood pressure decreased significantly with exercise intensity. In comparison with past studies, research has not focused on the effects of exercise on psychosocial stressor response[30, 40]. Previous research has achieved inconsistent results for exercise training to modify sympathetic responses to psychosocial stress. Other studies have suggested that exercise programs produce benefits in terms of stressor-induced reactivity[41–43]. Further, other studies have found that exercise-induced adaptation within 3 or 4 months (short-term) is a stressor factor or that cardiorespiratory fitness increases the magnitude of stress to psychosocial stressors[29, 44]. At the same time, a growing body of study has demonstrated the effects of exercise on metabolic syndrome[27, 28, 30–33]. One study has shown that

Table 4. Association of independent variables and metabolic syndrome components (n=89)

Variables		Waist circumference difference (cm)				Systolic Blood pressure difference (mmHg)			
		b	SE	95% CI	*p*-value	b	SE	95% CI	*p*-value
Job Strain (score)									
	Personal burnout difference	0.00	0.026	–0.051, 0.054	0.963	0.19	0.082	0.025, 0.350	0.024*
	Work-related burnout difference	0.01	0.034	–0.060, 0.077	0.814	0.25	0.107	0.039, 0.462	0.021*
	Job control difference	–0.02	0.044	–0.103, 0.071	0.719	0.00	0.139	–0.279, 0.275	0.989
	Job demand difference	–0.02	0.033	–0.085, 0.047	0.564	0.18	0.104	–0.024, 0.391	0.082
Intensity group									
	High vs Control	2.60	0.811	0.983, 4.207	0.002*	8.76	2.564	3.662, 13.855	0.001*
	Low vs Control	0.77	0.857	–1.446, 1.960	0.765	2.17	2.721	–3.236, 7.580	0.427
Demographic characteristics									
	Age (yr)	0.10	0.046	0.009, 0.193	0.031*	0.15	0.151	–0.152, 0.447	0.330
	Sex (male vs female)	2.00	0.888	0.239, 3.768	0.027*	0.01	2.909	–5.767, 5.795	0.996
Marital status	Married vs Unmarried	–1.69	0.796	–3.272, –0.106	0.037*	–1.90	2.594	–7.065, 3.254	0.466
	Married vs Divorce	–1.97	2.726	–7.393, 3.445	0.471	2.12	8.706	–15.184, 19.426	0.808
Education	High school vs University	–0.96	0.828	–2.606, 0.684	0.249	–1.59	2.651	–6.863, 3.676	0.549
	High school vs Master or above	–0.78	1.229	–3.218, 1.666	0.529	–6.92	3.851	–14.573, 0.736	0.076
Job characteristics									
Job category	Manager or above vs Technical support	1.12	1.952	–2.760, 5.001	0.567	08.45	6.164	–3.779, 20.705	0.174
	Manager or above vs Financial consultant	2.55	1.390	–0.214, 5.313	0.070	–3.22	4.500	–12.160, 5.728	0.477
	Manager or above vs Banking or office administration	–1.68	0.873	–3.410, 0.060	0.058	–0.81	2.873	–6.449, 4.830	0.776
	Manager or above vs Other	2.31	1.597	–0.865, 5.484	0.152	5.62	5.113	–4.544, 15.781	0.275
Salary (NT dollar)	≤$100,000 vs $100,001~500,000	0.39	0.872	–1.344, 2.122	0.657	2.40	2.768	–3.102, 7.901	0.388
	≤$100,000 vs $500,001~1,000,000	1.24	0.815	–0.383, 2.857	0.133	0.92	2.628	–4.308, 6.140	0.728
	≤$100,000 vs ≥1,000,001	–0.75	1.052	–2.844, 1.339	0.476	–0.90	3.360	–7.580, 5.777	0.789
	≤$100,000 vs Unknow	–3.59	1.918	–7.403, 0.221	0.065	–7.52	6.178	–19.794, 4.765	0.227
Health behavior (yes vs no)									
	Smoking status	0.41	0.470	–0.526, 1.344	0.378	–0.71	1.502	–3.700, 2.273	0.636
	Exercise Habit	–1.20	0.812	–2.810, 0.419	0.145	0.19	2.619	–5.011, 5.400	0.941
	Daily alcohol drinking	–1.50	1.950	–5.372, 2.378	0.445	3.48	6.219	–8.882, 15.841	0.577
Regular high fiber intake (meal/day)									
	None vs 3 meal	–1.37	1.951	–5.234, 2.511	0.486	–0.45	6.230	–12.830, 11.936	0.943
	None vs 2 meal	0.77	0.967	–1.155, 2.691	0.430	3.13	3.074	–2.985, 9.236	0.312
	None vs 1 meal	–0.02	0.873	–1.759, 1.710	0.978	–1.93	2.772	–7.440, 3.580	0.488

*$p<0.05$. Difference indicated pre-post intervention result. Control group: participants planned and carried out exercise regimes on their own. Low-intensity group: participants were assigned to attended one exercise session per week. High-intensity group: participants were assigned to attended two exercise sessions per week.

physical activity intervention reduced the harmful effects of high blood cholesterol level, high blood pressure, and obesity[28]. Our study has indicated similar results, with waist circumference (obesity) and systolic blood pressure significantly reduced in groups that exercised.

This study clarified the relationship between exercise, burnouts, and systolic blood pressure. In the Table 4, systolic blood pressure difference was independently associated with personal burnout, work-related burnout differences, while waist circumference differences also independently associated with high exercise intensity. Further, with adjustment for potential confounders, waist circumference and systolic blood pressure differences had a significant association only with exercise intensity (low- and high-intensity groups) (Table 5 and 6). Our study results have shown that exercise intensity had a strong influence in improving waist circumference and systolic blood pressure. At the same time, exercise intensity has modified the effect of systolic blood pressure difference regarding personal and work-related burnout difference.

Table 5. Adjusted impact of waist circumference difference (n=89)

Variables		Waist circumference difference[a] (cm)			
		b	SE	95%CI	*p*-value
Job Strain (score)	Personal burnout difference	–0.034	0.031	–0.096, 0.028	0.281
	Work-related burnout difference	–0.004	0.041	–0.086, 0.077	0.917
Intensity group	High vs Control	3.228	1.050	1.138, 5.318	0.003*
	Low vs Control	2.434	0.947	0.550, 4.318	0.012*
Adjusted R^2				0.170	

*$p<0.05$. [a]Adjusting for age, sex and marital status. Difference indicated pre-post intervention result. Control group: participants planned and carried out exercise regimes on their own. Low-intensity group: participants were assigned to attended one exercise session per week. High-intensity group: participants were assigned to attended two exercise sessions per week.

Table 6. Adjusted impact of systolic blood pressure difference (n=89)

Variables		Systolic Blood pressure difference[a] (mmHg)			
		b	SE	95%CI	*p*-value
Burnout (score)	Personal burnout difference	0.050	0.099	–0.148, 0.248	0.618
	Work-related burnout difference	0.110	0.131	–0.150, 0.370	0.401
Intensity group	High vs Control	13.435	3.351	6.766, 20.105	0.000*
	Low vs Control	7.806	3.022	2.173, 13.881	0.012*
Adjusted R^2				0.167	

*$p<0.05$. [a]Adjusting for age, sex and marital status. Difference indicated pre-post intervention result. Control group: participants planned and carried out exercise regimes on their own. Low-intensity group: participants were assigned to attended one exercise session per week. High-intensity group: participants were assigned to attended two exercise sessions per week.

Therefore, our findings have suggested that exercise intensity has a significant effect in the relationship between burnouts and systolic blood pressure in short-term exercise program. According to previous studies, relationships between physical activity, stress, and metabolic syndrome have received limited attention[30]. Few studies have shown inconsistent results concerning the relationship of physical activity to metabolic syndrome or both stress and metabolic syndrome[30–33]. The mechanism behind the inconsistency of effects is not clear with differences in population used in the studies as well as the frequency or intensity of the physical activity may have affected the results. However, our results were consistent with our previous exercise intervention study, which also found that risk factors were improved after implementation of a 12-wk exercise program[45]. The reduction in the metabolic syndrome components is attributed to the exercise protocols for this intervention. Our exercise program included gymnastics, aerobic exercise, and stretching to increase cardiopulmonary durability and muscle strength to contribute to the acceleration of the metabolic rate. Previous study has also addressed that the combination of strength and endurance training attenuates the muscle fiber hypertrophy and increases the cortisol alone with the enhancement of catabolic environment[46]. Burnout is considered as a symptom of job strain (physical fatigue and emotional exhaustion)[15, 16]. This study found the role of exercise in linking the cause-effect relationship between some job strain indicators and metabolic syndrome components. With short-term exercise program, the decrease in burnouts may translate into a decrease in blood pressure. Compare to other study that job demand affected systolic blood pressure in physical activities or exercise intensity[33]; our study suggested that exercise was an intervention factor, which significantly reduced the outcome of systolic blood pressure along with the improvement of personal and work-related burnout. As exercise intensity increased, physiological function of the body could prevent burnout and reduced metabolic syndrome components. Further, workplace exercise programs are a way to lead workers into healthier behavior with some literature suggesting chronic stress triggers development of metabolic syndrome along with an unhealthy lifestyle[11, 12, 21]. Our exercise program has alleviated damage caused by burnouts and metabolic syndrome components by changing health behavior.

One of the purposes of this study was to create practical workplace wellness programs to benefit the health of banking and insurance workers. Our study was conducted according to a non-randomized quasi-experimental design with the subjects recruited on a voluntary basis that may have led to selection bias. To some extent, the findings of the present study do not represent a generalization for banking and insurance enterprise populations. Although, randomized intervention testing will be necessary in the future, our exercise program still evidenced the improvement of burnouts and metabolic syndrome components after 12-wk intervention. There are some limitations in the current study. Since subjects were non-randomized to ensure the similarity of baseline data in each exercise sub-groups and arbitrary allotment of physical activity category created bias and affected inferences of our results. Some individuals probably chose to be part of the control group because of poor health, physical or mental disability, or busy work schedules for which they receive heavy work stress with these conditions preventing regular exercise. Our study runs into difficulties that subjects are not consistently participating workplace health promotion due to working conditions. In this case, healthier workers and workers with less stress may join exercise groups and the effects of the exercise program have been underestimated when healthier workers and workers with less stress have improvement in the health outcomes. Conversely, supervised dietary and physical activity were two important elements in contributing the metabolic syndrome components[27, 28]. Although, baseline data of exercise habits (yes or no) and regular high fiber intake was tested in the study results with no significant metabolic syndrome components, the detail baseline data of exercise routine (frequency), and calorie intake in each subject impacted the improvement of outcomes. We did not have data available on exercise routine and calorie intake, we cannot rule out the possibility that these explain the association. Self-selected exercise groups and health behaviors are critical factors that influenced our study results. However, most of baseline data evidenced no significant differences between the three sub-groups in the initial study population. The significant differences were adjusted in statistical results. Therefore, while it cannot be denied that differences between the groups and health behaviors affected the study results, to some extent, the possibility of selection bias might be limited in the analytical data.

Our study shows that female workers are more willing to join the exercise program than male workers, after we conducted an orientation that promoted the importance of healthy lifestyles to manage stress and having regular exercise and proper diet. Furthermore, a large proportion of females tended to participate in the higher-intensity sub-group. These results can be explained by the fact that banking and insurance female workers are willing to have healthier lifestyles. Previous studies also addressed that women were expected to outlive men in almost all countries; a large part of this can be explained by women's healthier behaviors and lifestyle[47, 48]. Other study suggested that health cognition changes lifestyle intervention in different ways among two genders. Compared to men, self-efficacy and planning of exercise may play significant factors related to exercise adoption for women[49]. In the work environment, males and females can have similar work positions with different manifestations or experiences of stress (work or in general). To some extent, the gender differences may have limited effect on the findings of our study while the variable of sex has been statistical adjusted. Since we did not perform separate analysis for two genders, future research regarding the relationship of exercise intervention, job stress, and metabolic syndrome should further explore the influence of gender difference with consideration of different manifestations or experiences of stress at work (or in general).

Further, the present study sample size was relatively small and small number of participants was affected by statistical pattern recognition. According to our previous exercise intervention study that used paired-*t*-test, when α=0.05 and power=80%, the calculation of statistical significance for exercise affecting systolic blood pressure difference ensured the sample size of at least 28 subjects (mean=5.39, SD=10.10). Exercise effect on waist circumference difference was ensured with the sample size at least 16 subjects (mean=2.48, SD=3.47)[45]. The current study has closely achieved the standard of significant sample size. Since similar study design and indicators were used in both studies, the effects on statistical pattern recognition is limited.

In summary, our study has demonstrated an approach to a worksite exercise program that decreases the harmful effects between job strain indicator and metabolic syndrome component. In this study, the effects of the exercise program are shown significant in several areas, with improvements in burnouts, and metabolic syndrome components being documented. The 12-wk exercise program has modified the health risks of personal burnout, work-related burnout, waist circumference, and systolic blood pressure. Adjusted impacts of higher exercise intensity are positively correlated with improvements in metabolic syndrome components. The results of our study have suggested that exercise programs change the cause-effect relationship between burnouts and metabolic syndrome components. A well-designed exercise program establishes better health behavior in the workplace by alleviating job strain factors and metabolic syndrome components. Our exercise program serves as a model of physical fitness programs for banking and insurance companies in the future.

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