

## Effectiveness of Worksite Intervention on Stress Management: An Analytic Literature Review

Kyoung-Ok Park

*Department of Health Education in Ewha Womans University*

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### I. Introduction

Diverse worksite health promotion programs to reduce work stress have been formulated and conducted during the last 20 years since the National Institute for Occupational Safe and Health (NIOSH) listed psychological stress as one of the top ten leading work-related diseases (Sauter et al., 1990). Among physiological, psychological, and behavioral strains against stressors, it is well documented that psychological strain is the primary symptom (House, 1981) because psychological symptom is not only a leading cause of disability at work but also affects

organizational productivity related to medical cost, absenteeism, and job performance (Conti and Burton, 1994).

National Interview Survey in the United States reported that more than 30% of employees had the working conditions threatening their psychological well-being (Shilling and Brackbill, 1987). In a national survey conducted by a Northwestern insurance company in the United States, 46% of the 600 workers interviewed said that their job was very stressful and 27% answered that their job was a primary cause of stress in their lives (Northwestern National Life Insurance Company, 1991). Among various psychological strains at work, depressive

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Corresponding author: Kyoung-Ok Park, Daehyun-dong #11-1 Soedaemoon-gu Department of Health Education in Ewha Womans University, Seoul, Korea  
 Tel: 82-2-3277-2578, E-mail: kopark@ewha.ac.kr

symptoms represent typical psychological strain in adult population, and approximately 10% working adults suffer from major depressive symptoms with more serious among female workers than male workers. Furthermore, many women experiencing depressive disorders belong to the active working ages between the age of 27 and 46 (Greenberg et al., 1996). In a study of depression conducted in a large financial company, the disability days for depression were greater than disability days for heart disease, lower back pain, and diabetes mellitus. Furthermore, depression showed the relapse rate 26% higher than that of diabetes mellitus (Conti and Burton, 1994). The annual salary-equivalent cost of psychological disorders in the U.S. labor force was enormous (Kessler et al., 1999; Eaton et al., 1990) because psychological strain decreases job performance as depressed workers can not fully concentrate on their jobs (Hurrell and Murphy, 1996; Dwyer and Ganster, 1991).

In recent years, diverse worksite intervention studies to reduce work stress have been conducted. Muscle relaxation, mediation therapy, biofeedback, cognitive-behavior skills development, and problem-solving counseling were commonly used in the stress management programs. Among the various stress intervention strategies, a participatory problem-solving approach has been developed to increase intervention

participation as well as its effectiveness in the worksite. This approach encourages participants' involvement from the intervention content design to evaluation methods of the intervention program. Vandenberg and colleagues (2002) mentioned that participatory problem-solving approach not only increased intervention effectiveness but also renovated health-related climate in the worksite. They conducted a comprehensive worksite health promotion intervention to improve total quality of work life using the participatory problem-solving approach for a retailing house ware company in the U.S. Southern region. Also, a multi-level approach has been used to maximize stress management effects supported by more than two level interventions within a study, for example at the individual, environmental, and organizational levels (Murphy, 1996). Multi-level approach is developed in intervention research based on the assumption that psychological stress is induced from diverse sources.

More intervention techniques and evaluation methods are being manipulated to improve worksite psychological well-being. However, few analytic trials to summarize the overall stress management effectiveness of numerous worksite interventions were conducted; furthermore, quantitative analytic reviews using the meta-analysis approach

were rare for worksite stress management interventions although diverse intervention techniques and more outcome measures were created from different perspectives. Therefore, the purpose of this analysis was to overview the empirical studies on worksite stress management and to identify the overall effect of worksite health promotion programs on stress management throughout those previous studies. Meta-analysis quantified the effects of these interventions and described the significant factors that might moderate the intervention effects of stress management.

## II. Methods

This study conducted an analytic review on the effects of worksite interventions on workers' psychological stress through academic journal articles published in English. Worksite intervention related to stress management were defined as the programs that were fully or partially developed to help workers modifying their appraisal of stress situations or to cope more effectively with the psychological symptoms or both. In other words, this study retrieved and reviewed all studies with diverse worksite interventions for workers' health and well-being including stress management. Thus, some studies were developed and conducted only for stress prevention and the

others were conducted for diverse health and well-being outcomes including stress management. As health promotion programs, stress management interventions include not only person-oriented relaxation programs but also the programs that aim to delete the sources of stress at work through job redesign or organizational change strategies.

Literature retrieval was conducted in two steps. The first step of literature retrieval was conducted through on-line search with the following criteria. The on-line literature search was done in MEDLINE, EBSCOhost Academic Search Premier, and PSYCHINFO academic databases in public health, psychology, sociology, and human resource management research topics. All publications should be written in English, and the type of publication was the peer-reviewed journal article and their publication period should be from 1990 to 2002. Key words used in literature retrieval were 'worksite,' 'intervention,' 'program,' 'work stress,' 'strain,' 'burnout,' 'management,' 'prevention,' 'education,' 'health promotion,' and 'mental well-being.' All retrieved studies should have at least one intervention-related keyword and one stress-related keyword. In the initial search more than 800 studies were retrieved.

The second literature retrieval was conducted in off-line process with the studies retrieved in the first step. A total of 37 worksite intervention studies were selected as

the literature of the second trial most appropriate for worksite intervention for stress management in this study. The second retrieval was conducted through brief review of the study abstract with the following criteria. (1) The dependent variable should be psychological stress reported by worksite employees with some self-report measures not by laboratory or physiological examination. Specifically, general psychological strain, depression, anxiety, and burnout were included in this criterion. (2) Research design should be experimental or quasi-experimental trial. That is, all studies reviewed in this study were randomly (experimental) or conveniently (quasi-experimental) designed with assigned intervention and control groups with at least two evaluations in the baseline and follow-ups. The dependent variable was counted in a way that permitted changes after the intervention should be calculated and compared with change in a control group without intervention. (3) The interventions should be fully or partially developed for psychological stress management. Independent variable was worksite intervention program designed for stress management or for various health behavior modification including stress management. (4) The effect sizes of intervention programs should be expressed as or transformed to 'r' values ('r' indicates Pearson's simple

correlation coefficient 'r' in this paper.). Effect size 'r' can be calculated from frequencies, percentages, t-test, and chi-square and F-tests. R values can also calculate binominal effect size, which indicate the change in success rates after the intervention program. These four criteria were repeatedly used in the second retrieval with the references at the end of most appropriate studies already retrieved for review.

The studies of non-experimental design without control group were excluded because it was difficult to control psychological symptom change by time, environmental changes, and communication between intervention and control individuals without comparison with no-intervention control group. The studies having doctor's diagnosis, physiological laboratory examination, or qualitative evaluation were excluded because of different levels of objectivity between self-reported measures and professional-examined measures. A primary publication was selected to review and the others were excluded when two or more papers were published in the same research project. A large number of studies did not report sufficient information for calculating effect size 'r' using standard methods although research design and evaluation type were appropriate.

The 18 studies selected from these retrieval steps were finally used in the

quantitative synthesis with Meta 5.3 statistical software. In studies having both intervention and control groups and before and after evaluation, effect size were calculated by subtracting the mean change for an experimental condition and dividing this difference by the initial pooled standard deviation. This analysis process was adapted from Dishman and colleagues' study (1998). Multiple effect sizes in one study were retrieved when intervention evaluation was conducted three or more times and when two or more psychological stress measures were employed in one study such as estimating depression and anxiety both in the same study.

Forty-eight effects were retrieved from 18 studies. The total sample size was approximately 3,580 people ( $N=3,583$ ). However, the total sample size displayed in Meta 5.3 analysis output was different from or great than 3,580 because the sample sizes of the studies reporting two or more effects were redundantly counted. Multiple effects were obtained from studies that reported separate  $r$  values by gender, intervention condition (two or more intervention conditions and control condition), number of outcome evaluation (pre-test, post-test, and follow-up test), and type of outcome measures (overall symptoms, anxiety, depressive symptoms, mood state, and burnout). Effects on personality properties, stress coping styles, stress management skills, or stress-related

behaviors (e.g., smoking and drinking) were excluded because these were not psychological stress symptoms. Factors that were suspected to moderate the observed effectiveness of worksite interventions on stress management were participants' characteristics (gender and job characteristics), research design, intervention period, intervention method, and sample size. Participants' gender was categorized by man, woman, and men, and women mixed. Job category was defined as blue-collar (factory workers and bus drivers), white collar (secretary, clerks, and office employees), and blue and white collar mixed. In terms of research design, studies were divided by randomized design and nonrandomized design. Intervention methods were traditional education with discussion session, education with skill building training, the participatory problem-solving approach, and the multi-level approach (individual, environmental, and organizational approaches).

Fisher's transformation of  $r$  was employed for analyses in order to adjust for the non-normal distribution of ' $r$ .' Effect size  $r$  was weighted by sample size to adjust for sampling error. The  $r$ -values reported in this paper were retrospective transformation from  $z$ . The residual standard deviation was used as the standard error in estimation 95% confidence intervals (CI). Homogeneity or each mean effect was tested with a random

effect model of variance with the Schmidt-Hunter method. An effect was judged to be heterogeneous when sampling error was less than 75% of the observed variance, and the residual standard deviation exceeded 75% of the effect (Rosenthal, 1991). Binomial effect size was also calculated from the analysis of the Schmidt-Hunter method. A multiple linear regression analysis was conducted in SPSS 10.1 to identify significant moderators. Aggregated effect size  $r$  was calculated separately by the levels of significant moderators which were identified in a multiple linear regression analysis through the same meta-analytic process as explained above. All studies included in the analysis are summarized in Table 3.

### III. Results

#### 1. Distribution of worksite intervention studies

Characteristics of the 18 worksite intervention studies related to stress management with 48 effect sizes were shown in Table 1. Worksite intervention studies with experimental design were 38.9%, which means that these studies randomly assigned their study participants to the intervention and the control groups. Worksite interventions for stress management were conducted more than 30% in the manufacturing companies and

27.8% in the public sectors. The public sectors were governmental office, public transportation, and military organization. Stress management intervention was also conducted in health care settings and general communities. Psychological symptoms measured in these worksite intervention studies were general psychological strain, anxiety, burnout, and the other symptoms (e.g., depression). General psychological strain was estimated in 12 studies with 66.7%. Burnout was a typical symptoms of stress in the worksite.

Intervention methods were education with discussion, education with skill building training, participatory problem-solving approach, and multi-level approach. Participatory problem-solving approach was the leading method of intervention for worksite stress management ( $n=6$ , 33.3%). On-site education to improve stress coping knowledge and skills was conducted in five studies with 27.8%. Coping skill building programs conducted in on-site education were body stretching, muscle relaxation, and meditation. Most evaluation methods employed in studies were self-administered survey. Then, mailing survey and interview survey were utilized in the studies in order. Fifty percent of studies evaluated the intervention effectiveness two times with pre and post of intervention. The other studies implemented their evaluation three or more

Table 1. Distributions of worksite intervention studies reviewed in this study

Characteristics	No. of Study	%
Research design		
Experimental	7	38.9
Quasi-experimental	11	61.1
Research setting		
School (medical college)	4	22.2
Manufacturing company	6	33.3
Public sector	5	27.8
Etc.	3	16.7
Psychological intervention outcome		
Psychological strain	12	66.7
Anxiety	4	22.2
Burnout	5	27.8
Etc. (including depression)	7	38.9
Intervention type		
Lecture and discussion	6	33.3
Lecture and skill building	5	27.8
Lecture and participatory problem-solving approach	6	33.3
Multi-level approach	1	5.6
Evaluation methods		
Self-report survey	14	77.8
Mailing survey	3	16.7
Interview survey	1	5.6
Evaluation design		
Pre-post only	9	50.0
Pre-post1-post2	9	50.0

Note: Two or more choices (or effects) can be assigned to one study. Thus, it is not necessary that the total numbers and percentage of studies are 18 or 100% within a characteristic.

times such as pre, post, and follow-up evaluations.

## 2. Effectiveness of worksite interventions on stress management

The stem-and-leaf display of the 48 effect sizes ( $r$ ) is presented in Figure 1. The 48 ' $r$ 's are distributed to the effect size groups of -0.2s, -0.1s, -0.0s, +0.0s, +0.1s, and so fourth

in effect size order. The group of +0.0s includes 0.00, 0.01 0.04, and 0.05. The largest effect size is 0.05 and the smallest one is -0.59 in Figure 1. Diverse effect sizes were transformed to  $r$ -values. Overall, the distribution of the 48 effects was about negatively skewed. This means that the stress management intervention programs in the worksite has the positive effect on reducing

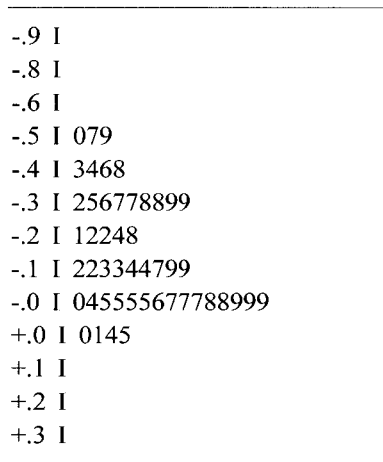


Figure 1. The stem-and-leaf display for 48 effects (r) from worksite stress management intervention  
 Note: All effect sizes (r) are displayed within 2 decimal points in Figure 1.

workers' psychological strain. Intervention groups had lower scores of stress measures than control groups. Effects ranged from -0.59 to 0.05 and there was no positive effect size greater than 0.05.

The average (95% CI) value of r weighted by sampling error was -0.14 (-0.32 to 0.05). This means that, overall, worksite interventions (+) were effective on reducing (-) workers' stress level although in the conventional category of effects, -0.14 is a small effect size (Cohen, 1988). Binomial effect size showed that success rates increased from 43% without intervention to 57% after an intervention. Sampling error explained 47.14% of the observed variance and its 95% confidence interval included zero, which means that the effectiveness of worksite interventions on stress management were heterogeneous not homogeneous. In the

conventional dimension, heterogeneous effects imply that there are certain moderating factors between worksite intervention effect sizes and psychological stress symptoms.

### 3. Moderating factors affecting the worksite interventions on stress management

In regression analysis, intervention period, sample size, intervention methods, study design, and participants' gender, and type of job were analyzed as suspected moderating factors affecting the worksite interventions. However, study design was the only significant moderating factor affecting the worksite intervention at 0.10 significance level (Table 2). The studies which had the randomly assigned intervention-control group design had smaller effects (smaller absolute values of r) than the studies which had



nonrandomized intervention-control group design ( $p= 0.06$ ).

Among the 48 effect sizes, 53% were randomized and the last 47% were nonrandomized. Twenty-four effects had randomized design and the mean value of  $r$  was  $-0.10$  ( $-0.16$  to  $-0.03$ ). The effects with randomized design were homogeneous because the confidence interval of  $-0.10$  did not include zero. Sampling error explained 91.6% of the observed variance. The other the 21 effects showed a nonrandomized design produced the mean value of  $r$  was  $-0.16$  ( $-0.37$  to  $0.05$ ). The effects with nonrandomized design were heterogeneous because the confidence interval of  $-0.16$  included zero. Sampling error explained only 32.5% of the observed variance. That is, a strong research design such as experimental design produced stable conservative effect sizes on stress management although the effect sizes was slightly smaller than that in

the nonrandomized studies. This finding also implies that quasi-experimental or non-experimental design may produce overestimated effect sizes of their interventions.

Table 3 is the summary of all reviewed worksite intervention studies and shows brief overview and the effectiveness of the worksite programs.

#### IV. Summary and Discussion

The analytic quantitative synthesis of worksite intervention and stress management studies identified that worksite interventions on stress management had a significant effect although the average effect size ( $r$ : pearson's simple correlation coefficient) was small ( $r$  weighted by sampling error =  $-.14$ ). The confidence interval of the average perceived psychological symptoms included zero which

Table 2. Linear regression analysis for moderators affecting stress management programs

Variables	Unstandardized Coefficients		Standardized Coefficients	t	P
	B	Std. Error	Beta		
$R^2 = 0.305$					
(constant)	-.09965	.198		-.502	.619
Intervention period (week)	.00085	.001	.174	.805	.426
Sample size (person)	.00020	.000	.248	1.251	.219
Gender (0: Man, 1: Woman)	.03625	.054	.130	.668	.509
Intervention Method	-.00081	.032	-.005	-.025	.980
Type of job (0: blue, 1: office, 2: professional)	-.03964	.029	-.322	-1.363	.182
<b>Study Design</b> (0: quasi, 1: experimental)	-.09858	.051	-.295	-1.920	.063

means that the intervention effectiveness was heterogeneous on stress management and moderating factors intervened. However, research design was only detected as a significant moderator for the intervention effectiveness in this analysis. Dishman and colleagues (1998) reported the similar moderating factor to this study. They conducted a meta-analysis of worksite intervention effectiveness to increase physical activity. The randomized experimental studies had smaller effects compared with studies using quasi-experimental design consistent to this study.

Murphy (1996) comprehensively conducted a narrative review of worksite stress management intervention at work. He reported that half of worksite stress management interventions had randomly assigned study design, which is consistent with the percentage of randomly assigned effects in this paper (53%). Murphy indicated outcome measures as a primary moderator. He reported that intervention effects varied according to the outcome measures and cognitive-behavioral skills were more effective on general psychological symptoms than the other intervention methods. He did not report an overall effect size nor mentioned effects of interventions in terms of study design.

The effect sizes with nonrandomized design seemed greater than those with

randomized design. However, confidence interval (CI) of the effects with nonrandomized design was still heterogeneous including zero; on the other hand, CI of the effects with randomized design was homogeneous. It means that randomized studies had stable effectiveness in reducing perceived psychological strain although their effect sizes were small. However, certain moderators intervened between the effects with nonrandomized study design and perceived psychological strains although the mean effect size of nonrandomized study design was larger than that of randomized design.

A primary limitation of this literature review was about diverse types of intervention at worksite. This study limited the intervention research for review at least partially involved stress management regardless of the primary intervention focus in each study. Stress management has been employed in numerous worksite intervention programs in different perspectives such as community health, organizational psychology, business, and social work. However, this study did not limit in any specific theoretical perspectives and that might be a major reason that the stress management effect sizes were heterogeneous over the reviewed worksite intervention studies with stress management.

Table 3. Characteristics and effect sizes (r) of worksites interventions on perceived stress symptoms

Study (year)	Setting	Participant	Research design	Intervention (period)	Outcome measure	Evaluation (method)	Effect size for Psychological strains (r)
Cecil & Forman (1990)	9 elementary and middle schools in U.S.	54 teachers (stress inoculation: 17, coworker support: 17 control: 20)	-Experimental -Recruiting volunteer teacher in 9 schools -Randomly assigned to 2 intervention and no-intervention control groups	-Education (+practice + problem-solving approach) -Stress inoculation training (SI): stress process, cognitive restructuring, relaxation skills -Coworker support group (CS): support network of small problem-solving group, sharing stress experiences and problems, discussing coping skills, organizing cognition on stress (once a week for 6 weeks)	<u>Psychological strain</u> <u>Anxiety</u> , coping skills	Pre-test Post test1: after intervention Post-test 2: 1 mo after intervention  (Self-report survey)	Psychological strain (SI: $r = -.17$ pre-post1, $r = -.32$ pre-post2 / CS: $r = .04$ pre-post1, $r = -.19$ pre-post2) Anxiety (SI: $r = -.14$ pre-post1, $r = -.08$ pre-post2 / CS: $r = -.09$ pre-post1, $r = -.05$ pre-post2)
Larsson et al. (1990)	6 high schools in Sweden	89 high schools teachers (intervention: 56, control: 33)	-Quasi-experimental -Recruiting health teachers from the 6 schools -Matched and no-intervention control group assigned.	-Education (+discussion, practice) -Providing a book of stress relaxation and a cassette tape for relaxation exercise -Learning stress theory, discussing personal stress, relaxation exercise experiences and practices (5-8 training meeting for 4 months)	stressors, life events, coping strategies, emotional stress, job satisfaction, <u>overall psychological strain</u> , <u>mood state</u>	Pre-test Post-test: 2 wk after intervention Post-test 2: 6 months  (Mailing survey)	Psychological strain ( $r = .37$ , pre-post) Mood state ( $r = .57$ , pre-post)
Pruitt (1992)	US army at Pentagon in U.S.	64 Army employees (intervention: 31, control: 33)	-Experimental -Lunch time education -Randomly assigned and no intervention control group	-Education about stress coping, time management, environmental modification, relaxation (Once a week/period was not shown)	<u>Anxiety</u> , <u>overall Psychological symptoms</u> , blood pressure	Pre-test Post-test: after intervention (Self-report survey)	Anxiety ( $r = .12$ ) Psychological strain ( $r = .19$ )
Heaney et al. (1993)	2 manufacturing plants in U.S.	176 employees	-Quasi-experimental -Voluntary recruiting participants and involved in 'participatory problem-solving' program -No-intervention control group	-Education and participatory problem-solving approach -Intervention topics: lack of information, communication, feedback, troubles with supervisors, and lack of decision-making -Topics were determined and employees participated in the programs in which they involved to develop. (Once a week for 4 years)	Participation, organizational climate, social support at work, <u>depressive symptoms</u>	Pre-test Post-test: after intervention  (Self-report survey)	Depression ( $r = .13$ , pre-post)

Study (year)	Setting	Participant	Research design	Intervention (period)	Outcome measure	Evaluation (method)	Effect size for Psychological strains (r)
Kline & Snow (1994)	4 company in Connecticut	115 working mothers employed in secretarial positions in 4 companies (intervention: 72, control: 43)	-Experimental -Recruiting participants in the 4 companies and conducting small group education -Randomly assigned control group	-Education -To enlarge coping skills and to practice throughout the program (source of stress, improper coping examples and the effects, and desirable stress management skills) (Once 90 minute per week for 15 weeks)	Role stress, social support, coping strategies, <u>psychological strain</u> , alcohol and tobacco use	Pre-test Post-test: after intervention Post-test: 6 months (Self-report survey)	Psychological Strain (r=-.05, pre-post 1 / r=-.07, pre-post2)
Cooley & Yovaboff (1996)	1 school in U.S.	67 special education teachers (intervention: 36, control: 31)	-Experimental -Recruiting voluntary teachers -Random assignment to groups -Wait-list no-intervention control group	-Stress management workshop (10 week; coping skills, skills for change perception at work) -Peer-collaboration workshop (4weeks; sharing work stress experience, problem evaluation, and solving skills) (Once a week for 14 weeks)	<u>Psychological strain</u> , <u>Burnout</u> , job satisfaction, Organizational commitment, Social validation	Pre-test Post-test: after intervention (Self-report survey)	Psychological Strain (r=-.22, pre-post) Burnout (r=-.05, pre-post)
Aust et al. (1997)	A public Transportation Company in Germany	46 bus drivers (intervention: 22, control: 24)	-Quasi-experimental -Recruiting volunteers -Convenient assignment to intervention and control groups	-Education (+problem-solving activity) -Education: coping skills, self-observation, muscular relaxation -Problem-solving activity: discussing some stressful work factors and suggest methods to change them. (Once a week for 12 weeks)	Need for control. Mood state	Pre-test Post-test: after intervention (Self-report survey)	Mood state (r=.01)
Malkinson et al (1997)	A light Industry factor In Israel	27 females blue collar workers in an entire production department (intervention: 13, control: 14)	-Experimental -Randomly assigned -Wait-list no-intervention control group	-Education (+problem-solving activity) -Education was conducted in multiple methods like skits, video, and practices. -Better coping skills and relaxation practice for work stressors (6 meetings for 2 months)	<u>Burnout</u> , <u>tension</u> , cognitive Weariness, work-home conflict	Pre-test Post-test: after intervention (Self-report survey)	Burnout (r=-.37) Tension (r=-.38)

Study (year)	Setting	Participant	Research design	Intervention (period)	Outcome measure	Evaluation (method)	Effect size for Psychological strains (r)
Dierendon Et al. (1998)	2 health care organizations in Netherlands	149 direct care professionals for mentally disabled persons (Intervention: 36, internal control: 39, external control: 74)	-Quasi-experimental -Recruiting health care professionals in two health care organizations (one intervention and one control) -Conveniently assigned control groups with no-intervention	-Education (+discussion cognitive-behavioral oriented) -Changing cognitive on work situations, presenting work goals and expectation, developing relaxation skills (once a week for 5 weeks)	<u>Psychological strain</u> , burnout, social support, turnover intention, absenteeism	Pre-test Post-test1: 6mo after intervention Post-test2: 1yr (self-report survey)	Psychological Strain (r=-.08, internal1/ r=-.35, internal2/ r=.13, external2/ r=-.24, external2) Burnout (r=-.07, internal1/ r=-.09, internal2/ r=-.09, external1/ r=.14, external2)
Kushnir et al. (1998)		64 health care professionals in worksite in Israel (intervention: 39/control: 25)	-Quasi-experimental -Wait-list no-intervention control group	-Education (+discussion, practice) -Cognitive changes on stress -Conducting a stress management course in one semester period (3 hours per week for 14 weeks)	<u>Burnout</u> , psychological Efficacy	Pre-test post-test : after intervention (Self-report survey)	Burnout (r=-.36)
Maes et al. (1998)	3 site of a manufacturing company in Netherlands	264 employees (Intervention: 134 from 1 site. Control: 130 from 2 site)	-Quasi-experimental -All were eligible but not mandatory. -Randomly assigned within the target sites and no-intervention control group	-Education, training, and support to the intervention (multi-level approach) -Education on nutrition, alcohol, drug, smoking, work stress, headaches, back pain in individual level -Training on social skills and leadership for 40 hours in middle management level -Support in organizational level for on-site exercise facilities, a smoking policy in the cafeteria, providing healthy foods, posting posters and newsletter (3 times a week for 3 years)	Interview: health behaviors, quality of work Survey: <u>psychological strain</u> (anxiety, depression, somatic, hostility, social support) Biomedical exam: heart rate, BP, cholesterol, body weight	Pre-test Post-test1: 1yr Post-test2: 2yr Post-test3: 3yr (interview, survey, biomedical exam)	Psychological Strain (r=.0, pre=post 1/ r=.05, pre-post 2/ r=.05, pre-post 3)

Study (year)	Setting	Participant	Research design	Intervention (period)	Outcome measure	Evaluation (method)	Effect size for Psychological strains (r)
Pelletier et al. (1998)	The county of San Mateo in U.S.	66 employees in the San Mateo county (intervention 1: 21/ intervention2 : 20/ control: 25)	-Experimental -Voluntary recruiting employees -Randomly assigned control group	-Education(+skill building) on stress effects and coping skills and stress perception -Group1: Health educators called to participants and talked and discussed about stress management in the materials delivered every 6 weeks for a year -Group2: Only delivered the same materials as Group1 had. -Group3: No intervention (mailing all materials one year later at a time) (Once every 6 weeks for a year)	<u>Psychological strain at work</u> , perceived work stressors	Pre-test Post-test (Mailing survey)	Psychological Strain (r=-.43, Group1 vs. Group3/ r=-.28, Group 1 vs. Group 3)
Mikkelsen & Saksvik (1999)	41 post offices in 2 cities in Norway	Front-office staff and clerical personnel, 15 intervention / 21control from 13 post offices in City 1, 50 intervention /30 control from 21 post offices in City 2	-Experimental -Nine intervention group meetings were conducted in all intervention groups. -Randomly assigned and no-intervention control group.	-Participatory group discussion and problem-solving activity -Discussing job design, performance appraisals, feedback, communication, training, physical work environment, trust, job involvement with supervisors and consultants in each meeting, and modifying and finding better methods for good worksite in 'search conference'. (Once a week for 3 months)	Subjective health, anxiety, organizational commitment, job demands, job control, social support, learning climate, job satisfaction	Pre-test Post-test1: 1wk after intervention Post-test2: 1yr (Self-report survey)	Anxiety (r=-.04,pre-post in City 2)
Jones & Johnston (2000)	One nursing school in Scotland	79 nursing students in a nursing school in Scotland (intervention: 40/ control: 39)	-Experimental -The upper 1/4 students in stress scores were recruited by phone at baseline survey. -Randomly assigned to groups -Control students also had the social meetings.	-Stress management coping skill development program -One way lecture, practices, discussion for stress coping skill development -Group-based program not exceeding 14 persons per group (Two hours per week for 6 weeks)	Sickness, absence, stress coping methods, <u>psychological strain</u> , <u>anxiety</u> , <u>depression</u>	Pre-test Post-test1: after intervention Post-test2: 12wk (Self-report survey)	Psychological strain (r= .48 at post1), Anxiety (r= .39 at post1), Depression (r= .50 at post1)

Study (year)	Setting	Participant	Research design	Intervention (period)	Outcome measure	Evaluation (method)	Effect size for Psychological strains (r)
Gold et al. (2000)	Branches from private and public sectors in U.S.	1741 employees in the 6 branches (intervention: 607/ control: 1134)	-Quasi-experimental -Voluntary recruiting participants -No-intervention control group	-Education by phone and distribution materials by mail -To develop change skills and to organize change process of health behaviors -Topics: drinking alcohol, tobacco use, back care, blood pressure control, cholesterol control, driving safety, eating habits, exercise weight control, mental health, stress management, preventive examination, and self-care (Once every 6 month for 2 years)	Chronic conditions, health status, 13 lifestyles (including <u>stress management and psychological strain</u> )	Pre-test Post-test: 2 years (Mailing survey)	Psychological Strain (r=-.07, pre-post) Stress coping (r=-.12, pre-post)
Bekker et al. (2001)	Government Setting in Netherlands	49 adults having jobs and participating in the work stress prevention course arranged by RIAGGs (intervention: 36/ control: 13)	-Quasi-experimental -Voluntary recruiting working adults -Assigning all participants to select a control-person having similar demographics to them -Matched control group	-Education (+discussion) -To increase assertiveness, coping skills, relaxation, and realistic thinking -Courses were processed by group (Once a week for 10-12 weeks)	<u>Psychological strain, somatic symptoms, perceived stress, coping strategies, gender role stress, autonomy, locus of control</u>	Pre-test Post-test 1: after The course Post-test 2: 3month after the course (Self-report survey)	Burnout (r=-.59 for men, r=-.39 for women, pre-post1) Somatic symptoms (r=-.06 for men, r=-.46 for women, pp1) Psychological Strain (r=-.38 for men, r=-.44 for women pre-post1)
Williams et al. (2001)	A university in Virginia	75 adults having jobs and participating in the intervention conducted by a university (intervention: 44/ control: 31)	-Quasi-experimental -Voluntary recruiting -Participants were assigned to one group of several consisting of 10-17 persons -Wait-list control group	-Education (+participatory problem-solving) -To increase insight into their perceptions, reaction, and behaviors in life and work situations (practice of mindfulness) (6 classes, 1 home-practice, and 1 retreat for 8 weeks)	<u>Psychological strain, daily hassles, medical symptoms</u>	Pre-test Post-test 1: after course Post-test 2: 3month after (Self-report survey)	Psychological Strain (r=-.21, Pre-post 1 /r=-.22, pre-post 2)

(Received: Nov., 3, 2004; Accepted: Dec., 8, 2004)

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## ABSTRACT

With growing significance of psychological well-being in the worksite, the purpose of this analysis was to overview the empirical studies on worksite stress management and to identify the overall effect of worksite health promotion programs on stress management through meta-analysis. Literature retrieval was conducted on-line first in MEDLINE, EBSCOhost Academic Search Premier, and PSYCHINFO databases in public health, psychology, sociology, and human resource management areas. All studies written in English and published in the peer-reviewed journals during 1990 and 2002 were recruited. Key words used in literature retrieval were 'worksite,' 'intervention,' 'program,' 'work stress,' 'strain,' 'burnout,' 'management,' 'prevention,' 'education,' and 'health promotion.' A total of 18 worksite intervention studies with 48 effect sizes were analyzed and the results were as follows.

Approximately 60% of the studies had quasi-experimental design and were conducted in manufacturing company and public sector. General psychological strains and burnout were frequently used measures of psychological stress. The lecturing and discussion typed intervention and the participatory problem-solving typed intervention were employed more than others in the studies.

The average effect ( $r$ : pearson's simple correlation coefficient) weighted by sampling error was  $-0.14$  ( $-0.32$  to  $0.05$ ). In the conventional category of effects this is a small effect ranging from  $-0.59$  to  $0.05$ . Binomial effect size showed that success rates increased from 43% without intervention to 57% after an intervention. Sampling error explained 47.14% of the observed variance and its effectiveness on stress management were heterogeneous. In regression analysis with suspected moderating factors affecting the worksite interventions, research design was the only significant moderating factor. The studies with quasi-experimental design had greater effects than the studies with experimental design.

**Key Words:** Health promotion, Intervention, Stress Management, Literature Review, Meta-analysis, Worksite