

Effects of a Stress Management Program for Hospital Staffs on Their Coping Strategies and Interpersonal Behaviors

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Abstract: The present study examined effects of a 3-h stress management program for Japanese hospital staffs that included relaxation and assertion training. Twenty-seven hospital staffs (mean age: 29.4 yr) in a stress management group and 28 hospital staffs (mean age: 29.5 yr) in a wait-list group answered evaluation surveys at both pre- and post-intervention. Self-administered questionnaires including items on job stress, coping strategies, and interpersonal behaviors were evaluated. The stress management program was given six different participant groups: 3 groups were the stress management group and 3 groups were the wait-list group. The program increased active coping and decreased dependent behavior scores significantly in the stress management group, while decreasing assertive behavior scores in the wait-list group. A comparison of the education sub-groups showed that the first group had significantly increased assertiveness and decreased dependency scores. The second group had significantly decreased depression-anxiety scores. The data analyzed for men and women separately showed the stress management intervention significantly improved active coping and assertive behavior in men and dependent behavior in women. A brief one-time stress management program can be effective in improving active coping and assertive behaviors as well as reducing dependent behavior in hospital staffs. Sex differences were noteworthy.

Key words: Assertion, Interpersonal behavior, Intervention, Japanese hospital staffs, Relaxation, Stress management

Introduction

Nursing is a highly stressful occupation. Several surveys on stress factors among medical workers have

been conducted in Japan^{1, 2)}. These workers report that interpersonal conflicts, heavy workloads, low job control, ambiguous roles at work, emotional conflicts at work, and cooperation problems are stress factors. Specifically, interpersonal conflicts such as those with patients, supervisors and colleagues, and medical doctors account for a large part of the stress among medical workers²⁾. These chronic job-related stress factors are associated with low job

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satisfaction³) as well as poor mental and physical health of medical workers⁴).

Stress management interventions have been proposed, and their effectiveness in reducing stress and improving physical and mental health among medical workers has been investigated⁵⁻⁷). Relaxation training, meditation, a combination of both, and a combination of these techniques with others, including cognitive-behavioral therapy, have been found effective in reducing stress levels in medical workers⁸⁻¹²). Communication skills training, especially assertion training, has been investigated and has shown effectiveness in improving medical workers' communication skills and reducing their stress¹³⁻¹⁷).

These studies used a long (30–120 min) multi-session training (3–6 sessions) format. A previous study reported that a multi-component program of six sessions in a company reduced stress levels and increased job performance if employees participated in all sessions¹⁸). However, 54% of participants did not participate in every session. Therefore, the positive effects of the program were reduced significantly when all participants were included in the analyses. A meta-analysis has suggested that shorter sessions are more effective¹⁹).

In hospital settings, stress management training should be feasible for medical workers who have limited time for participation because of their work duties. Taniguchi *et al.*²⁰) examined the effectiveness of brief relaxation training (10 min) in one session, and showed to reduce stress levels as measured by salivary IgA levels, indicating immune function. On the other hand, Kawandt²¹) compared the effectiveness of a one-session relaxation program of three hours to that of a humorous program and also to controls. There was no significant difference in the groups after the intervention. However, the relaxation group reported the most desirable effects.

In a brief one-session stress management program, one technique is easiest to implement. However, review studies of stress management training recommend a combination of two or more techniques to address the multidimensional nature of the stress response^{22, 23}). The effectiveness of self-care training in reducing workplace stress, including cognitive techniques, relaxation training, and social support education, has been reported as significant compared to environmental management such as changes in nursing methods²³).

Because the importance of effective communication as a fundamental element of nursing has been acknowledged, communication skills training, especially assertion training, has gained attention¹³⁻¹⁷). Self-assertion can affect

satisfaction in interpersonal relationships. Assertiveness is a prerequisite for achieving self-esteem and is necessary for autonomy and growth toward self-actualization¹³). In a series of studies by Helgeson²⁴), assertive behavior as a personal trait was associated with psychological well-being, whereas dependent behavior was predictive of depressive symptoms.

Hirokawa²⁵) designed a brief assertion training of 70 min that was integrated into a stress management program for female students and examined its effect on interpersonal behavior, as measured by the Communion-Agency Scale (CAS)²⁶). This program increased assertive behavior, including demonstration of a strong will and a sense of being able to deal with difficulties. Even brief teaching of relaxation techniques and assertive communication skills could be effective and feasible in improving stress levels and interpersonal behavior.

It is noteworthy that there were significant sex differences in behavioral responses to stress (i.e., coping strategies and interpersonal behavior, including assertive and dependent behaviors). Women, on average, showed a tendency to use more passive coping than men²⁷). Women tend to be more cooperative and dependent on others, whereas men tend to be more assertive and aggressive²⁴). Sex differences in these behavioral responses to stress should be considered.

There are a few studies that have examined brief session programs for medical workers^{20, 21}). However, those studies included only one technique. A combination of two or more techniques in a stress management program is recommended^{22, 23}), and the effectiveness of shorter sessions has been demonstrated¹⁹). In this study, a brief one-session stress management program that included a combination of relaxation training and assertive communication skills was designed for hospital staffs. In particular, this program focused on assertive communication skills that can be effective in situations specifically encountered by hospital workers. The purpose of the present study was to examine the effectiveness of a brief one-session stress management program at hospitals to improve stress levels and interpersonal behavior. The hypothesis tested was that hospital staffs in the stress management group would improve their interpersonal behavior to be more assertive, thus reducing their stress levels compared with those in the waiting group. When sex differences were considered, women in the stress management group were expected to increase active coping and assertive behavior, and decrease dependent behavior.

METHODS

Participants

Hospital staffs, except for medical doctors, were recruited through the administrators of two hospitals in a local area to voluntarily participate in a study concerning mental health education. This education was conducted once a month as “on-the-job training” for six months. It was given six times to different participant groups. Participants could attend only once because there was a seating capacity of about 50 for each group. Participants were asked to register for one of the six groups based on their schedule. Three groups were assigned to the stress management group, and three groups were assigned to the wait-list group. A hospital manager determined an almost equal number of participants from each department, considered their work schedule and workload, and then assigned them to one of the groups. None of the allocation procedures for participants were disclosed to the experimenters.

The baseline questionnaire survey was conducted one month before the first education session. The completed questionnaires were collected by staffs at the hospitals within two weeks. Among participants in the mental health education ($n = 267$), 102 hospital staffs agreed to participate in the present study, and 91 completed the questionnaire at baseline. Among the 91 participants, 47 (10 men and 37 women) hospital staffs were included in the stress management group, and 44 (17 men and 27 women) were in the wait-list group. The breakdown of the stress management group was 4 men and 10 women in the first group, 2 men and 13 women in the second group, and 4 men and 14 women in the third group.

After the education for the third group was finished, post-education assessment was conducted with the 91 participants. A total of 55 participants completed all relevant questionnaires in both groups (stress management group, $n = 27$; wait-list group, $n = 28$). The breakdown was 1 man and 7 women in the first group, 7 women in the second group, 3 men and 9 women in the third group, and 12 men and 16 women in the wait-list group. There were 20 dropouts (6 men and 14 women) in the stress management group and 16 (5 men and 11 women) in the wait-list group. The study profile is presented in Fig. 1.

The stress management education was given for the wait-list group after all procedures were finished. The characteristics of the participants by group are detailed in Table 1.

Ethical treatment

This study was conducted after obtaining approval from the Ethics Committee of Okayama University Graduate School of Medicine, Dentistry, and Pharmaceutical Sciences and the ethics committee of the participants' hospital. The instructor explained the outline of the study to each participant, and all signed informed consent forms prior to participating.

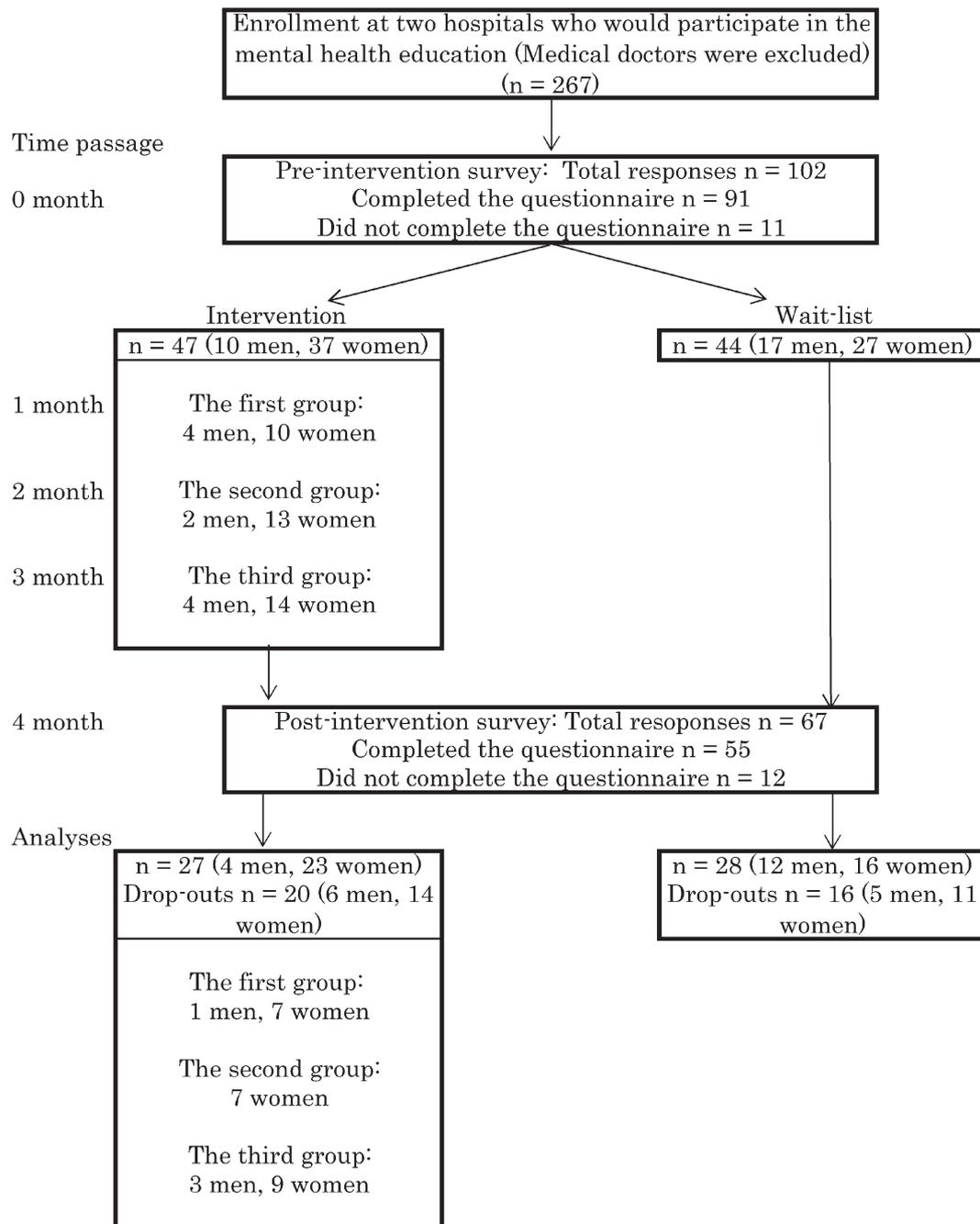
The stress management program

The contents of the stress management program are summarized in Table 2. The program was 3 h long and conducted in a room where the temperature was adjusted to an appropriate level for participant comfort. The training team comprised an instructor (registered nurse), a designer of the stress management program (psychologist), an assistant of the instructor (graduate student), and an advisor (medical doctor).

The instructor distributed a booklet containing topics about stressors, stress symptoms, and stress coping and lectured on mental health from it. The lecture lasted approximately 60 min.

The relaxation training was planned successively and guided by Solin's integrated training²⁸. Before starting the training, the instructor explained and demonstrated an abdominal respiratory technique. The 10-min training course comprised four parts: (a) progressive muscle relaxation, including tensing and relaxing the muscles of the legs and arms, shoulders, face, and whole body; (b) abdominal respiration; (c) meditation, including imagining a special place where one can have a relaxing time; and (d) stretching the arms and getting up. The instructor read to the participants from a text on relaxation training. Participants sat on chairs during the training.

Next, a communication skills training technique for assertion was used. After a lecture on the assertion technique, the participants worked in an assertion workbook to learn assertive communication patterns such as 1) describing situations, 2) emphasizing with others, 3) making suggestions, including one's own opinion, and 4) making a choice²⁵. In the workbook, there were three cases presented in which a person should be assertive, and the participants had to write dialogues and feelings describing the cases. After this individual work was completed, the participants worked in small groups to discuss and write up what should comprise better communication.



* Only those who responded in all the questions were included in the analyses since these evaluation variables are hypothesized to be interrelated.

Fig. 1. Study profile of participants

Questionnaires

Job stress

A Japanese version of the Job Content Questionnaire (JCQ) was used to measure work environment characteristics. The Japanese version of the JCQ has been validated

and tested for reliability²⁹⁾. Cheng *et al.*³⁰⁾ reported correlation coefficients indicating moderate temporal stability for job control, job demand, and social support (0.60, 0.54, and 0.41, respectively) over four yr. The questionnaire comprises scales related to job control (9 items),

Table 1. Summary of the participants

| | Intervention group (n=27) | | | | Wait-list group (n=28) | | | | <i>p</i> |
|----------------------|---------------------------|------|-----|------|------------------------|------|-----|------|----------|
| | n | Mean | SD | % | n | Mean | SD | % | |
| | 27 | | | | 28 | | | | |
| Sex | | | | | | | | | |
| Male | 4 | | | 14.8 | 12 | | | 42.9 | 0.04 |
| Female | 23 | | | 85.2 | 16 | | | 57.1 | |
| Age (yr) | | 29.4 | 7.1 | | | 29.5 | 7.4 | | 0.95 |
| Male | | 28.5 | 3.9 | | | 28.6 | 7.0 | | 0.98 |
| Female | | 29.5 | 7.5 | | | 30.2 | 7.8 | | 0.79 |
| Job | | | | | | | | | |
| Registered nurse | 7 | | | 25.9 | 4 | | | 14.3 | 0.79 |
| Assistant nurse | 4 | | | 14.8 | 3 | | | 10.7 | |
| Physiotherapist | 5 | | | 18.5 | 6 | | | 21.4 | |
| Medical technologist | 4 | | | 14.8 | 4 | | | 14.3 | |
| Medical secretaries | 5 | | | 18.5 | 6 | | | 21.4 | |
| Others | 2 | | | 7.4 | 5 | | | 17.9 | |

p-values were based on a chi-squared test used to examine differences in sexes and types of jobs between groups, and a t-test to examine differences in age between groups.

Table 2. Contents of the stress management program

| Time (minute) | Content |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 10 | Program introduction Explanation of the stress management program |
| 60 | Lecture about "stress" |
| 20 | Relaxation training (Solin, 1996) Abdominal respiratory technique Progressive muscle relaxation |
| 10 | Break |
| 70 | Assertive training Lecture on assertive communication (assertiveness, aggressiveness, and nonassertiveness) Assertive training using a workbook (Hirokawa, 2009) Group discussion |
| 10 | Summary and questions |

job demand (5 items), supervisory support (4 items), and coworker support (4 items). Job control assesses ability to make decisions, be creative on the job, and develop one's ability. Job demand assesses quantity of work, intellectual requirements, and time constraints of the job. In the demand-control model, job stress occurs when job demands are high and job control is low³¹⁾. Likert scale response options from 1 (completely disagree) to 4 (completely agree) were used. Each scale score was calculated by summing the scores according to the JCQ guidelines³¹⁾. Cronbach's alpha coefficients (α) among the study subjects were 0.68 for job control, 0.57 for job demand, 0.90 for supervisor support, and 0.81 for coworker support. The alpha coefficient for job demand was very low compared

with the required level in the present study.

Coping strategies

The Stress-Coping Scale includes 14 items³²⁾ comprising two subscales: active coping (8 items, $\alpha = 0.73$) and passive coping (6 items, $\alpha = 0.80$). The participants were asked first to write freely about a very stressful event and then assess the frequency of their coping methods, choosing 0 for "never," 1 for "once in a while," 2 for "sometimes," or 3 for "always." Sample items for active and passive coping scales were "You try to change your present situation" and "You wait for time to pass," respectively.

Mental health

The Stress Response Scale-18 (SRS-18)³³ was used to assess participants' level of mental health. This scale includes 18 items ($\alpha = 0.93$) comprising three subscales: depression-anxiety (6 items, $\alpha = 0.86$), sullenness-anger (6 items, $\alpha = 0.90$), and apathy (6 items, $\alpha = 0.78$). Each item is rated on a 4-point scale: "strongly disagree = 0," "slightly agree = 1," "moderately agree = 2," "agree = 3."

Interpersonal behavior

To evaluate participants' interpersonal behavior, the communion-agency scale (CAS)²⁶ was used. The CAS comprises 24 items, including communion (6 items, $\alpha = 0.59$) and agency (6 items, $\alpha = 0.77$); and unmitigated agency (6 items, $\alpha = 0.81$) and unmitigated communion (6 items, $\alpha = 0.73$). Communion assesses participants' cooperative behavior, and agency assesses their assertive behavior. Unmitigated agency assesses aggressive behavior, and unmitigated communion assesses dependent behavior. Participants responded to each item in terms of how well the item described their personal situation, choosing from 1 "not at all" to 4 "very true". A higher score indicated a higher tendency for those traits. The coefficient alpha for communion was very low compared with the required level in the present study.

Statistical analysis

A chi-square was calculated to examine different proportions of sex and types of jobs in the intervention and wait-list groups. A *t*-test was performed to examine difference in age between the groups. A repeated measures analysis of variance (ANOVA) was conducted to examine the effects of stress management intervention on job stress, coping strategy, mental health, and interpersonal behavior scores, controlling for sex. The group was the between-subjects factor, time was the within-subjects factor, and sex was a covariate. A significant interaction effect of group (intervention vs. wait-list) and time (pre vs. post) was considered an effect of intervention. Three sub-groups were included in the intervention group, and the post evaluation was conducted at different points after the intervention (three mon later for the first group, two mon later for the second group, and one mon later for the third group). A sub-group (first, second, and third vs. wait-list) \times time (pre vs. post) repeated-measures ANOVA controlling for sex was conducted again. The sub-group was the between-subjects factor, time was the within-subjects factor, and sex was a covariate. As an index of effect size, partial eta squares were calculated based on the interaction

effect of group and time. Cohen's *ds* were also calculated based on group means and standard deviations of differences between pre- and post-scores (post-pre), and a *t*-test was performed on group means of differences between pre- and post-scores. To consider sex differences related to effects of stress management intervention, stratified analyses by sex were conducted. A 2 (group) \times 2 (time) repeated measures analysis of variance (ANOVA) was conducted for men and women separately. A 4 (sub-group) \times 2 (time) repeated-measures ANOVA was also conducted for men and women separately. Analyses were performed using SPSS version 16.0. A *p*-value < 0.05 was considered statistically significant.

Results

Group and time interactions

The means (standard errors) of the measured dependent variables are detailed in Table 3. No significant interaction effect of group and time was observed in job stress or mental health scores. A significant interaction effect of group and time was observed in active coping ($F(1, 47) = 6.72, p = 0.01$, partial eta square = 0.13), assertive behavior ($F(1, 51) = 9.55, p < 0.01$, partial eta square = 0.16), and dependent behavior ($F(1, 51) = 6.43, p = 0.01$, partial eta square = 0.11).

According to Bonferroni's post hoc test, the intervention group had a significantly increased active coping score at post-intervention compared with pre-intervention, whereas the scores at pre- and post-intervention did not change in the wait-list group. Assertive behavior scores at pre- and post-intervention did not change in the intervention group, whereas the wait-list group had a significantly decreased score at post-intervention compared with pre-intervention. The intervention group had a significantly decreased dependent behavior score at post-intervention compared with pre-intervention, whereas the scores between pre and post-intervention did not change in the wait-list group.

Because the intervention group comprised three sub-groups that received the intervention at different points, the passage of time from the intervention to the post-intervention assessment point were different (three mon for the first group, two mon for the second group, and one mon for the third group). Therefore, differences in the sub-groups were examined. The results are shown in Table 4. A significant interaction effect of sub-group and time was observed in depression-anxiety ($F(3, 48) = 3.24, p = 0.03$, partial eta square = 0.17), assertive behavior ($F(3, 48) = 5.08, p < 0.01$, partial eta square = 0.24), and dependent

Table 3. Mean scores and standard errors (SEs) of job stress, coping strategy, mental health, and interpersonal behavior between stress management group and wait list group

| | Intervention group | | | | Wait-list group | | | | <i>p</i> [#] | Partial eta-square [#] | <i>p</i> [*] | Cohen's <i>d</i> [*] |
|-------------------------------|--------------------|-----|-------------------|-----|-------------------|-----|-------------------|-----|-----------------------|---------------------------------|-----------------------|-------------------------------|
| | pre-intervention | | post-intervention | | pre-intervention | | post-intervention | | | | | |
| | Mean | SE | Mean | SE | Mean | SE | Mean | SE | | | | |
| Job stress | | | | | | | | | | | | |
| Job demand | 35.9 | 1.5 | 37.7 | 1.6 | 34.3 | 0.9 | 34.8 | 1.0 | 0.37 | 0.02 | 0.72 | 0.10 |
| Job control | 69.6 | 2.8 | 72.5 | 2.6 | 67.6 | 1.7 | 68.4 | 1.6 | 0.16 | 0.01 | 0.86 | -0.05 |
| Support from supervisor | 11.5 | 0.6 | 11.8 | 0.6 | 12.0 | 0.4 | 12.0 | 0.4 | 0.68 | 0.003 | 0.59 | -0.15 |
| Support from coworker | 12.1 | 0.5 | 12.2 | 0.5 | 12.6 | 0.4 | 12.0 | 0.3 | 0.09 | 0.05 | 0.33 | 0.26 |
| Coping strategy | | | | | | | | | | | | |
| Active coping | 13.9 ^b | 1.1 | 15.5 ^a | 0.9 | 14.7 | 0.8 | 13.8 | 0.7 | 0.01 | 0.13 | 0.15 | 0.41 |
| Passive coping | 10.0 | 1.2 | 10.3 | 1.1 | 9.2 | 0.8 | 8.8 | 0.7 | 0.60 | 0.01 | 0.60 | 0.15 |
| Mental health | | | | | | | | | | | | |
| Depression-anxiety | 12.0 | 1.2 | 11.2 | 1.3 | 11.6 | 0.9 | 11.4 | 0.9 | 0.73 | 0.002 | 0.57 | -0.15 |
| Sullen-anger | 11.7 | 1.2 | 10.4 | 1.3 | 12.0 | 0.9 | 11.9 | 0.9 | 0.41 | 0.01 | 0.32 | -0.27 |
| Apathy | 11.9 | 1.0 | 11.0 | 1.1 | 11.8 | 0.7 | 11.5 | 0.8 | 0.53 | 0.01 | 0.76 | -0.08 |
| Total score | 35.5 | 3.1 | 32.7 | 3.3 | 35.4 | 2.2 | 34.8 | 2.3 | 0.47 | 0.01 | 0.43 | -0.22 |
| Interpersonal behavior | | | | | | | | | | | | |
| Assertiveness | 15.2 | 0.8 | 16.2 | 0.7 | 16.2 ^a | 0.6 | 15.3 ^b | 0.5 | <0.01 | 0.16 | 0.04 | 0.57 |
| Cooperativeness | 17.6 | 0.5 | 18.9 | 0.6 | 18.1 | 0.4 | 18.1 | 0.4 | 0.06 | 0.07 | 0.65 | 0.12 |
| Aggressiveness | 12.7 | 0.8 | 12.9 | 0.7 | 11.8 | 0.6 | 11.2 | 0.5 | 0.30 | 0.02 | 0.19 | 0.36 |
| Dependency | 17.2 ^a | 0.8 | 15.5 ^b | 0.8 | 15.6 | 0.6 | 15.7 | 0.6 | 0.01 | 0.11 | 0.04 | -0.56 |

Note: means were controlled for sex. [#]*p* values and partial etha-squares were based on the interaction of group and repeated-time. a and b indicated a significant different values according to Bonferroni post hoc test ($a > b, p < 0.05$). ^{*}*p* values from t-test and Cohen's *ds* were calculated based on groups' means and standard deviations of differences between pre and post-scores (post - pre).

behavior ($F(3, 48) = 5.50, p < 0.01$, partial eta square = 0.26).

According to Bonferroni's post hoc test, the second group had a significantly decreased depression-anxiety score at post-intervention compared with pre-intervention. The first group had a significantly increased assertive behavior score at post-intervention compared with pre-intervention, whereas the wait-list group had a significantly decreased score at post-intervention compared with pre-intervention. The first group had a significantly decreased dependent behavior score at post-intervention compared with pre-intervention.

Stratified analyses by sex

In men, a significant interaction effect of group and time was observed for support from coworkers ($F(1, 14) = 5.30, p = 0.04$, partial eta squared = 0.27, Cohen's *d* = 1.54), active coping ($F(1, 14) = 7.05, p = 0.02$, partial eta squared = 0.34, Cohen's *d* = 1.75), and assertive behavior ($F(1, 14) = 8.39, p = 0.01$, partial eta squared = 0.37, Cohen's *d* = 1.50). According to Bonferroni's post-hoc test, support from coworkers was decreased at post-intervention (M

= 11.92, $SE = 0.48$) compared to pre-intervention ($M = 12.83, SE = 0.45$) in the wait-list group ($p < 0.05$). There was no significant difference in the intervention group ($M = 13.00, SE = 0.83$ and $M = 12.50, SE = 0.79$ at post- and pre-intervention, respectively). On the other hand, active coping and assertive behavior were increased at post-intervention (active coping: $M = 17.25, SE = 1.95$, assertive behavior: $M = 17.00, SE = 1.22$) compared to pre-intervention ($M = 13.75, SE = 1.99$ and $M = 14.75, SE = 1.15$, respectively) in the intervention group. There was no significant difference in the wait-list group (active coping: $M = 14.75, SE = 1.13$, assertive behavior: $M = 16.00, SE = 0.71$ at post-intervention, and active coping: $M = 16.17, SE = 1.15$, assertive behavior: $M = 17.17, SE = 0.67$ at pre-intervention).

In women, a significant interaction effect of group and time was observed in dependent behavior ($F(1, 37) = 4.44, p = 0.04$, partial eta squared = 0.11, Cohen's *d* = -0.60). According to Bonferroni's post-hoc test, no difference was found in either group.

Differences in sub-groups were examined by sex. Because there was a very small number of men in the first

Table 4. Mean scores and standard errors (SEs) of job stress, coping strategy, mental health, and interpersonal behavior by sub-group

| | First group (n=8) | | | Second group (n=7) | | | Third group (n=12) | | | Partial eta-square [#] | Contrast 1* | | Contrast 2* | | Contrast 3* | | | | | | |
|-------------------------------|-------------------|-------------------|-------------------|--------------------|-------------------|-----|--------------------|-------------------|------|---------------------------------|-------------|------------------|-------------|------------------|-------------|------------------|------|-------|------|-------|--|
| | pre-intervention | post-intervention | SE | pre-intervention | post-intervention | SE | pre-intervention | post-intervention | SE | | <i>p</i> | Cohen's <i>d</i> | <i>p</i> | Cohen's <i>d</i> | <i>p</i> | Cohen's <i>d</i> | | | | | |
| | Mean | Mean | SE | Mean | Mean | SE | Mean | Mean | SE | | Mean | SE | Mean | SE | Mean | SE | | | | | |
| Job stress | | | | | | | | | | | | | | | | | | | | | |
| Job demand | 35.4 | 2.7 | 35.1 | 2.8 | 36.0 | 1.9 | 37.6 | 2.0 | 36.4 | 1.9 | 38.6 | 2.0 | 0.60 | 0.04 | 0.30 | 0.41 | 0.47 | 0.34 | 0.72 | -0.14 | |
| Job control | 69.9 | 4.9 | 74.1 | 4.6 | 67.1 | 3.5 | 70.9 | 3.2 | 70.1 | 3.6 | 70.9 | 3.3 | 0.31 | 0.08 | 0.84 | -0.10 | 0.29 | 0.39 | 0.30 | -0.38 | |
| Support from supervisor | 11.6 | 1.1 | 13.1 | 1.2 | 12.0 | 0.8 | 10.9 | 0.8 | 11.1 | 0.7 | 11.4 | 0.7 | 0.52 | 0.05 | 0.33 | -0.35 | 0.22 | -0.60 | 0.47 | 0.26 | |
| Support from coworker | 12.0 | 1.0 | 11.8 | 1.0 | 11.9 | 0.7 | 11.1 | 0.7 | 12.0 | 0.6 | 12.4 | 0.6 | 0.15 | 0.10 | 0.81 | 0.09 | 0.69 | -0.17 | 0.02 | 0.74 | |
| Coping strategy | | | | | | | | | | | | | | | | | | | | | |
| Active coping | 13.6 | 2.1 | 15.3 | 1.8 | 13.1 | 1.5 | 13.1 | 1.3 | 14.3 | 1.3 | 16.1 | 1.1 | 0.08 | 0.14 | 0.90 | 0.05 | 0.50 | 0.32 | 0.06 | 0.72 | |
| Passive coping | 9.6 | 2.1 | 11.5 | 1.9 | 9.3 | 1.5 | 10.1 | 1.3 | 10.4 | 1.5 | 9.8 | 1.4 | 0.69 | 0.03 | 0.67 | 0.21 | 0.52 | 0.29 | 0.96 | 0.02 | |
| Mental health | | | | | | | | | | | | | | | | | | | | | |
| Depression-anxiety | 12.9 | 2.5 | 10.1 | 2.5 | 12.3 ^a | 1.8 | 8.9 ^b | 1.8 | 11.4 | 1.5 | 11.7 | 1.6 | 0.03 | 0.17 | 0.41 | 0.30 | 0.04 | -0.86 | 0.79 | -0.09 | |
| Sullen-anger | 11.8 | 2.5 | 10.9 | 2.6 | 10.9 | 1.8 | 10.1 | 1.9 | 12.2 | 1.5 | 10.2 | 1.6 | 0.69 | 0.03 | 0.64 | 0.18 | 0.55 | -0.27 | 0.24 | -0.48 | |
| Apathy | 13.1 | 2.0 | 11.1 | 2.2 | 11.0 | 1.4 | 10.3 | 1.5 | 11.5 | 1.3 | 10.9 | 1.4 | 0.54 | 0.04 | 0.66 | 0.17 | 0.72 | -0.17 | 0.54 | -0.23 | |
| Total score | 37.7 | 6.4 | 32.2 | 6.4 | 34.1 | 4.5 | 29.3 | 4.5 | 35.1 | 4.0 | 32.8 | 4.0 | 0.30 | 0.07 | 0.48 | 0.28 | 0.19 | -0.54 | 0.28 | -0.35 | |
| Interpersonal behavior | | | | | | | | | | | | | | | | | | | | | |
| Assertiveness | 14.2 ^b | 1.6 | 17.3 ^a | 1.4 | 16.1 | 1.2 | 16.1 | 1.0 | 15.3 | 1.0 | 15.6 | 0.9 | <0.01 | 0.24 | 0.04 | 0.78 | 0.29 | 0.43 | 0.20 | 0.47 | |
| Cooperativeness | 18.4 | 1.0 | 19.2 | 1.2 | 17.6 | 0.7 | 18.0 | 0.9 | 17.4 | 0.6 | 18.7 | 0.8 | 0.32 | 0.07 | 0.89 | -0.07 | 0.67 | 0.19 | 0.61 | 0.19 | |
| Aggressiveness | 12.1 | 1.7 | 13.8 | 1.4 | 11.1 | 1.2 | 11.6 | 1.0 | 13.1 | 1.0 | 12.7 | 0.9 | 0.32 | 0.07 | 0.17 | 0.54 | 0.28 | 0.42 | 0.62 | 0.17 | |
| Dependency | 18.8 ^a | 1.6 | 14.9 ^b | 1.6 | 15.0 | 1.1 | 15.4 | 1.1 | 17.0 | 1.0 | 15.9 | 1.0 | <0.01 | 0.26 | <0.01 | -1.19 | 0.70 | 0.15 | 0.08 | -0.64 | |

Note: means were controlled for sex. [#]*p* values and partial eta-squares were based on the interaction of group and repeated-time. a and b indicated a significant different values according to Bonferroni post hoc test (a > b, *p* < 0.05). **p* values from t-test and Cohen's *d*s were computed basing on the two groups' means and standard deviations of differences between pre and post-scores (post - pre): Contrast 1 was made between first group and wait-list group; Contrast 2 was made between second group and wait-list group; Contrast 3 was made between third group and wait-list group.

and second groups, results for men shown here are only for reference. In men, significant interaction effects of subgroup and time were observed for job demand ($F(2, 12) = 4.55, p = 0.03$, partial eta squared = 0.43, Cohen's $d = 2.70$), support from supervisor ($F(2, 13) = 5.23, p < 0.01$, partial eta squared = 0.45, Cohen's $d = 4.87$), assertive behavior ($F(2, 13) = 8.81, p < 0.01$, partial eta squared = 0.58, Cohen's $d = 5.48$), and dependent behavior ($F(2, 13) = 6.45, p = 0.01$, partial eta squared = 0.50, Cohen's $d = -4.90$). According to Bonferroni's post-hoc test, job demand was increased at post-intervention compared to pre-intervention in the third group ($M = 41.50, SE = 3.10$ and $M = 35.50, SE = 2.27$, respectively). There was no significant difference in job demand in the first group at post- compared to pre-intervention ($M = 33.00, SE = 4.25$ and $M = 36.00, SE = 3.22$, respectively). Support from supervisor and assertive behavior were increased at post-intervention compared to pre-intervention in the first group (support from supervisor: $M = 16.00, SE = 1.33$ and $M = 11.00, SE = 1.61$, respectively; assertive behavior: $M = 19.00, SE = 2.46$ and $M = 13.00, SE = 2.33$, respectively). There was no significant difference in the third group at post- and pre-intervention (support from supervisor: $M = 11.67, SE = 0.77$ and $M = 11.67, SE = 0.93$, respectively; assertive behavior: $M = 16.33, SE = 1.42$ and $M = 15.33, SE = 1.34$, respectively). On the other hand, dependent behavior was decreased at post-intervention compared to pre-intervention in the first group ($M = 14.00, SE = 3.05$ and $M = 20.00, SE = 2.58$, respectively). There was no significant difference in dependent behavior at post- and pre-intervention in the third group ($M = 15.67, SE = 1.76$ and $M = 17.00, SE = 1.49$, respectively).

In women, significant interaction effects of sub-group and time were observed for depression-anxiety ($F(3, 35) = 4.02, p = 0.01$, partial eta squared = 0.26, Cohen's $d = -1.23$) and dependent behavior ($F(3, 35) = 3.16, p = 0.04$, partial eta squared = 0.21, Cohen's $d = -1.27$). According to Bonferroni's post-hoc test, depression-anxiety was decreased at post-intervention compared to pre-intervention in the second group ($M = 8.86, SE = 1.76$ and $M = 12.29, SE = 1.84$, respectively). There was no significant difference in the first and third groups (first group: $M = 14.29, SE = 1.76$ and $M = 11.71, SE = 1.84$; third group: $M = 10.00, SE = 1.55$ and $M = 11.11, SE = 1.63$). Dependent behavior was decreased at post-intervention compared to pre-intervention in the first group ($M = 15.71, SE = 1.11$ and $M = 17.57, SE = 1.15$), whereas there was no significant difference in the second and third groups (second group: $M = 15.43, SE = 1.11$ and $M = 15.00, SE = 1.15$;

third group: $M = 16.11, SE = 0.98$ and $M = 17.00, SE = 1.02$).

Discussion

The stress management intervention for hospital staffs served to significantly improve active coping and assertive behavior and reduce dependent behavior. Interpersonal behaviors such as assertiveness and dependency showed significant changes within three months after the intervention. In the second group, for which the post-intervention was administered two months after the intervention, depression-anxiety levels were reduced at post-intervention compared with pre-intervention. There were sex differences related to effects of the stress management intervention. The intervention significantly improved active coping and assertive behavior in men. On the other hand, women in the intervention group showed a decreased tendency for dependent behavior, especially the first group, as shown at post-intervention. Furthermore, depression-anxiety levels were reduced in women in the second group at post-intervention.

The one-session program in the present study increased active coping strategies. Stress management interventions are defined as techniques and programs designed to help employees modify their appraisal of stressful situations and/or deal more effectively with the symptoms of stress²²). Active coping includes problem-focused strategies such as problem solving, seeking social support, and confronting; passive coping includes emotion-focused strategies such as distancing, escape-avoidance, self-control, and positive appraisal³⁴). A study that conducted multiple sessions of relaxation training reported a reduction in participants' passive coping strategies³⁵). Active, problem-focused coping has been proposed as a way to improve adjustment, while passive coping has been shown to be associated with depressive symptoms^{27, 36}). During the lecture in this study, the instructor stressed the importance of active coping strategies and provided exercises showing the effectiveness of relaxation and assertive communication. Findings showed that lectures on coping with stress and exercises that involve at least two coping methods can stimulate more active coping strategies in participants. Coping strategies are considered effective when the behavior alleviates uncomfortable feelings caused by threat or loss³⁷). On the other hand, when stressful situations are not dealt with in a successful manner, coping strategies are considered ineffective³⁸). Increased active coping can moderate the impact of stressors on well-being. One study

showed that medical workers who engaged in active coping had better mental health as well as higher self-esteem and internal locus of control³⁹⁾.

The most significant effects of the program were shown in changes in interpersonal behavior. Assertive behavior is associated with psychological well-being, whereas dependent behavior can be predictive of dysphoria²⁴⁾. Assertive behavior showed a negative association with dependent behavior²⁴⁾. When assertive behavior is increased, dependent behavior can be reduced. In this study, significant changes in interpersonal behavior were observed in the first group three months after participation in the intervention. The instructor distributed a booklet that explained stressors and stress coping strategies so that participants could review the stress management program after their session. Results obtained in this study were based on post-education assessment conducted at varying lengths of time after intervention for the different groups. Whether these results were attributable to a time effect, or to actual group differences, was not investigated. Furthermore, the assertive behavior score in the wait-list group decreased. Reasons for this change were not clarified in this study, but there are several possibilities: a) changes in individuals' work environments, b) reduced motivation caused by the long wait until participation in the intervention, and c) communication with participants in the intervention group who were becoming more assertive. A follow-up evaluation would be necessary to investigate time effects on the intervention and determine whether assertive behavior in the wait-list group changed after receiving the intervention.

In the present study, job stress factors and mental health scores showed little change as a result of the stress management program. A significant decrease was found only in the second group for which the post-intervention was administered two months after the intervention. A review study pointed out that intervention studies show insufficient evidence for the effectiveness of brief stress management training in reducing job stress levels among healthcare workers⁴⁰⁾. Adequate follow-up was discussed as a way to maintain beneficial effects of the intervention. Modification of job stress factors and mental health levels may require a long passage of time, the same as for behavioral changes. Therefore, a follow-up survey may be required to investigate the effectiveness of stress management on job stress factors and mental health levels.

When the data were analyzed by sex, support from coworkers for men in the wait-list group was reduced at post-intervention compared to pre-intervention. There

were also sex differences in active coping, and assertive and dependent behaviors. In men, stress management intervention may serve to increase active coping and assertive behavior, which could lead to more social support at work. For women, stress management intervention may reduce dependent behavior and depression-anxiety. However, the present study included a small male sample, and the proportions of men and women in the groups were unequal. Therefore, whether the stress management intervention has a specific effect for men and women could not be clarified. Because sex differences in coping strategies and interpersonal behavior are noteworthy, they should be considered in stress management interventions.

Limitations in the present study have to be discussed. This was a non-randomized control study. Participants participated in the intervention on a voluntary basis and could select the time of the session. Although instructors of the stress management program were not informed about the allocations, negligible selection bias must be considered. However, there was no significant difference in scores at pre-intervention between the groups. As a selection bias, respondents might have had higher health awareness than non-respondents because they chose to participate in the mental health on-the-job training. However, the percentage of respondents was almost the same in each session. To improve the response rate, the hospital staffs reminded participants to respond to the survey. Reasons for the high number of drop-outs could not be determined. However, the lengthy time associated with the evaluation survey for the intervention group and the long wait to participate in the intervention for the wait-list group could have been contributing factors. In addition, the size of the questionnaires could have led to incomplete responses. Because all participants voluntarily participated in the study, it was their decision whether they returned their questionnaire to hospital staffs. The shortcomings in the procedure should be improved to reduce dropouts. As a possible measurement bias, test-retest reliability should be considered. For most scales, the test-retest reliability (i.e., the temporal stability) was unknown. If there was marked temporal instability in the scales, the effect of the intervention may have been underestimated because of greater random error in the measurements. The session for the intervention group was conducted once a month, with the assessment questionnaire administered at different times. It is unclear whether results of the sub-analyses were related to the time effect or group difference. The stress management program in the present study was a one-time offering. Therefore, whether participants incorporated information

acquired from the stress management program into daily life was not investigated.

Even this brief one-time stress management program increased active coping and assertive behaviors and decreased dependent behavior. The feasibility and effectiveness of a stress management program is very important for hospital staffs. Recent studies have investigated effects of web-based stress management training for Japanese workers¹⁴. Web-based stress management could assist hospital staffs in continuing training in daily life after a one-time stress management program. It is also necessary to institute an effective occupational mental health program for both men and women that facilitates their motivation to continue engaging in active coping strategies. To construct a feasible and effective stress management program for hospital staffs, stress factors should be sufficiently assessed and needs related to job stress should be addressed in the program.

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