Coping Skills Training to Reduce Psychosocial Risk Factors for Medical Disorders: A Field Trial Evaluating Effectiveness in Multiple Worksites

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Abstract: Coping Skills Training to Reduce Psychosocial Risk Factors for Medical Disorders: A Field Trial Evaluating Effectiveness in Multiple Worksites: Virginia P. Williams, et al. Williams LifeSkills, Inc., USA—Objective: To determine whether a commercial coping skills training program shown to reduce psychosocial risk factors in randomized clinical trials of patients with coronary heart disease is also effective in achieving similar improvements among stressed workers in a real world corporate setting. Methods: Conduct an observational trial to evaluate the impact of the Williams LifeSkills Workshop on depression, social support, anxiety, and hostility in a sample of 110 employees working at multiple U.S. sites of a client of Williams LifeSkills, Inc. Results: All psychosocial risk factors showed highly significant improvements from pre- to post-training. Except for social support, these improvements were maintained at six months follow-up. Conclusions: These findings provide support for the effectiveness of the Williams LifeSkills Workshop by suggesting that its efficacy, as demonstrated in randomized clinical trials, generalizes to real world settings like the multiple U.S. work sites of a corporate client. (J Occup Health 2009; 51: 437–442)

Key words: Behavioral interventions, Coping skills training, Effectiveness, Workplace stress

As one result of changes in workplace structure over the past two decades, workers in industrialized economies face increasing demands and decreasing job security—stressors which can increase negative emotions like depression, anxiety, and anger and reduce social support in the workplace. Surveys have shown that short term disability affects 37 to 48% of workers who are depressed. Compared with other nervous and mental disorders, depression-related disability affects more workers, lasts longer, and is more likely to recur. One large survey found that workers who reported high levels of both stress and depression had medical costs that were 2.5 times higher than costs in workers who reported low stress and depression. Work outcomes also are affected by depressive symptoms. A total of over 6,000 employees of three corporations completed surveys in 1993 and 1995. The odds of missed work days due to health problems were twice as high for employees with depressive symptoms both times as for those without depressive symptoms in either year. The odds of decreased effectiveness at work, as measured by self-report, was seven times higher. Workplace stress also fosters a work environment in which persons with high levels of trait anger and a cynical attributional style are more likely to react with violence and aggression.

Psychosocial distress engendered by workplace stress has been shown to increase the risk of developing cardiovascular disease and other major medical disorders in healthy populations and/or have an adverse effect on prognosis once disease is present. Hostility, depression, and social isolation have been shown to be risk factors for both the development of CVD, and the latter two confer a poorer prognosis in patients with established CHD. The evidence relating to anxiety is less extensive, but some investigators have reported an increase in CHD risk among persons with high anxiety levels. Biologically plausible mechanisms that could account for the increased disease risk have been found in persons with these psychosocial risk factors, including increased cardiovascular and neuroendocrine responses to stress, increased risky health behaviors, increased platelet activation, and increased levels of inflammatory markers.

The growing body of evidence suggesting that these psychosocial factors are harmful to health has led to...
interest in the development of behavioral interventions that could reduce psychosocial risk factor levels and ameliorate their adverse health consequences. Several early trials in CHD patients\textsuperscript{12-14} reported improved clinical outcomes in patients participating in group-based interventions that both provide social support and teach patients coping skills that will enable them to manage stress and negative affects. Training in coping skills has also been shown to improve prognosis in malignant melanoma\textsuperscript{15} and to reduce costs of medical care in distressed patients with chronic medical conditions\textsuperscript{16}.

Based on the research that has identified psychosocial risk factors and the early trials suggesting that behavioral interventions can ameliorate the adverse health effects of these factors, we\textsuperscript{17} have developed a highly structured and protocolized group-based intervention, the Williams LifeSkills\textsuperscript{8} Workshop, that has the general aims of helping people to manage negative emotions and improve interpersonal relationships.

There have been two small but carefully conducted randomized clinical trials that have evaluated some or all elements of the Williams LifeSkills\textsuperscript{8} Workshop as a means to reduce hostility and other psychosocial risk factors in CHD patients. In the first, Gidron, Davidson, and Bata\textsuperscript{18} found that, compared to patients randomized to usual care, high hostile post-MI patients receiving LifeSkills-based hostility reduction training showed reductions in both hostility and blood pressure that were maintained at two months follow-up after the end of the training. When followed up six months after the training, patients who received hostility reduction training experienced a 75% reduction in days in hospital, with a savings over six months of approximately $2 for every dollar spent on the training\textsuperscript{19}.

In the second, Bishop \textit{et al}.\textsuperscript{20} conducted a randomized clinical trial of the Williams LifeSkills\textsuperscript{8} Workshop in a heterogenous group post-CABG patients who had not been selected on the basis of any psychosocial risk factor. Compared to those randomized to a placebo condition (a one-hour lecture on stress), those randomized to the LifeSkills arm showed significant reductions in anger, depression, and percieved stress and increased satisfaction with social support and satisfaction with life at the end of training, with further improvements noted at three months follow-up. Those receiving LifeSkills training also showed reduced resting SBP and HR following training and at three months follow-up. Blood pressure reactivity to anger recall was also reduced both at the end of training and at follow-up. HR reactivity to anger recall was not reduced at the end of training, but was reduced at follow-up, suggesting that patients had continued to use the skills they learned during the training, with an emerging impact on HR reactivity.

We established Williams LifeSkills, Inc. (WLS), in 1996 with the business goal of marketing the LifeSkills Workshop and related products (including both video and “E-Learning” versions of the Workshop) to both medical (e.g., HMOs) and corporate clients. A randomized trial of the assertion module of the LifeSkills Video showed it to be effective in improving assertion performance in response to written scenarios, as well as reducing aggression expressed in the responses to the scenarios\textsuperscript{21}.

More recently, a randomized trial targeting distressed community volunteers has shown the full LifeSkills Video to be as effective as the LifeSkills Workshop in producing decreases in psychosocial risk factors compared to a wait list control condition\textsuperscript{22}.

In accord with current calls for “T-2” translational research that fields and evaluates “interventions in real world settings,”\textsuperscript{23} a guiding principle for WLS is that, in order to maximize the translation of psychosomatic/behavioral medicine research into practice that can achieve wide benefits for both healthy and patient populations, it will be necessary to package our behavioral interventions into standardized products that can be delivered in a wide range of settings with the expectation that similar benefits will be achieved across a variety of real world settings. If such products achieve success in penetrating both the medical and corporate markets, then WLS will have succeeded in its goal of translating behavioral and psychosomatic medicine research findings into practice and disseminating the benefits of that translation to the largest possible number of people who can benefit from such training.

As part of ongoing quality improvement efforts, one of our corporate clients, who wishes to remain anonymous, asked that we conduct a quality improvement study to document the effectiveness of LifeSkills training by obtaining assessments of psychosocial risk factors before and after the LifeSkills Workshop and at six months follow-up among its employees taking the LifeSkills Workshop. We report here results of what can be considered a field trial of the LifeSkills Workshop delivered to those employees in a real world setting, showing that LifeSkills training improves psychosocial risk factors, both following training and at follow-up six months later.

\textbf{Methods}

\textit{Study population}

Subjects were employees of a WLS corporate client which has requested anonymity. A total of 110 employees (77\% Caucasian; 66\% female; mean age: females, 42.5 ± 9.8, males 45.3 ± 6.9) in eight work sites spread around the U.S. participated in the LifeSkills Workshop at their work site during the regular workday. Both clerical and supervisory (20\%) personnel were included in the sample. Median length of employment with this corporate client was 10.5 yr. Some were referred by the employee assistance program (EAP) at their worksite, while others
chose to participate in response to announcements on flyers posted around the worksite and in the company newsletter, but it was not recorded which employees in the workshops had come by which of these routes. Time constraints prevented implementation of plans to assess a comparison group at comparable intervals to the group receiving the training. There were no other stress management programs available at any of the eight worksites. As part of the conditions required by the company, all identifiers that would allow us or anyone else to identify individual living human beings were removed from all materials used to assess psychosocial risk factors and destroyed prior to any data entry or analysis. Therefore, these quality improvement data are exempt from IRB review [45CFR45.101.(b)(4)] and not subject to further HIPAA considerations [45CFR164.514(b)].

Procedures

Participants were asked to complete and mail back Williams LifeSkills a battery of psychosocial questionnaires prior to the Workshop, within two weeks of completing the Workshop, and six months later. Completion rates depended upon employees returning the questionnaires and varied as a function of different questionnaires being returned with varying frequencies and ranged from 79 to 92 % for the Before and After assessments, and from 51 to 62 % for the six months assessment.

The Workshop consisted of 12 h of training, delivered over the course of a two-day period. It uses a standardized approach employing facilitator explanation of the rationale for each skill, modeling of the use of the skill by the facilitator, participants’ in-session exercises, and homework practice of the skill to provide hands-on training in ten skills: Awareness of Thoughts and Feelings, Evaluation of Thoughts and Feelings, Strategies to Change Your Reaction, Strategies to Change Stressful Situations (Problem Solving, Assertion, and Saying No), Speaking Up, Listening, Empathy, and Increasing the Positive. (Table 2), with the exception of social support, all these improvements were maintained, d’s, 0.71–1.31. At six months follow-up (N=110), while preserving orthogonality of results. Analyses of the subsample having additional 6-mo follow-up data (N=74) allowed evaluation of the maintenance of changes. In the simplest models, not testing between group effects (to reduce the number of employees omitted due to missing group data), a random blocking effect of subject ID was used along with the fixed repeated measure of time. In those models further testing demographic or job type effects. A between-groups fixed-effect such as gender or job type was added, along with the fixed effect of time and its interaction with group membership. The main effect of the between-groups variable was tested using the random effect of subject IDs across groups. Effect sizes (d) were first calculated as MeanBefore – MeanAfter / S.D.Pooled and then corrected for the correlation between Before and After levels by calculating d*, such that d* = d / SqRt(1-r)31. Alpha was set at p<0.05.

Results

None of the demographic or job type categories were associated as main effects with any of the psychosocial outcome measures (all p’s>0.08). All four psychosocial risk factors improved significantly from Before to After the Workshop (Table 1). There was a 30% decrease in depression, a 20% decrease in hostility, a 12% decrease in state anxiety, a 10% decrease in trait anxiety, and a 3% increase in social support, representing large effect sizes d’31, from 0.79–1.49. At six months follow-up, those completing the assessments (N=74) allowed evaluation of the maintenance of changes. In the simplest models, not testing between group effects (to reduce the number of employees omitted due to missing group data), a random blocking effect of subject ID was used along with the fixed repeated measure of time. In those models further testing demographic or job type effects. A between-groups fixed-effect such as gender or job type was added, along with the fixed effect of time and its interaction with group membership. The main effect of the between-groups variable was tested using the random effect of subject IDs across groups. Effect sizes (d) were first calculated as MeanBefore – MeanAfter / S.D.Pooled and then corrected for the correlation between Before and After levels by calculating d*, such that d* = d / SqRt(1-r)31. Alpha was set at p<0.05.

Psychosocial measures

Depression was assessed with the Centers for Epidemiological Studies Depression scale (CES-D25). Social support was assessed with Cohen’s Interpersonal Support Evaluation List (ISEL26). Anxiety and hostility assessments were added after the first 16 employees completed their pre-workshop assessments. State and Trait Anxiety were assessed with Spielberger’s State-Trait Anxiety Inventory (STAI27), and hostility was assessed using 9 items from the Cook and Medley Hostility Scale that have been shown28 to correlate strongly with scores on the full Scale.

Statistical analysis

Analyses using repeated measures mixed models were done in two groups—those completing the assessments Before and within two weeks After training and those completing all three assessments. Comparing Before vs. After alone maximized the number of usable observations (N=110), while preserving orthogonality of results. Analysis of the subsample having additional 6-mo follow-up data (N=74) allowed evaluation of the maintenance of changes. In the simplest models, not testing between group effects (to reduce the number of employees omitted due to missing group data), a random blocking effect of subject ID was used along with the fixed repeated measure of time. In those models further testing demographic or job type effects. A between-groups fixed-effect such as gender or job type was added, along with the fixed effect of time and its interaction with group membership. The main effect of the between-groups variable was tested using the random effect of subject IDs across groups. Effect sizes (d) were first calculated as MeanBefore – MeanAfter / S.D.Pooled and then corrected for the correlation between Before and After levels by calculating d*, such that d* = d / SqRt(1-r)31. Alpha was set at p<0.05.
showed a nonsignificant decrease.

Discussion

As shown in Table 1, prior to training the mean CES-D score was below the clinical threshold score of 16, but it was well above the norms reported by Radloff\(^25\) ranging from 7.9 to 9.3 in three normative samples. Mean score on the ISEL social support scale was slightly above the general population and college student norms (32.9–38.8) reported by Cohen\(^{139}\) et al.\(^{26}\). Extrapolating from the 9-item hostility scale to the full 50-item Cook-Medley Ho scale that has been used in much previous research yields a mean pre-training level of 24.5. In one prior study of medical school graduates, Barefoot\(^{29}\) et al. found that Ho scores above 13–14 were associated with a 2-fold increase in risk of developing coronary heart disease and a 7-fold increase in risk of dying from any cause over a 25-yr follow-up period. In a similar study of an older sample of workers in the Western Electric Study Shekelle et al.\(^{30}\) found a 50% increase in risk of dying from any cause over a 20-yr follow-up among those with scores above 20. The State and Trait Anxiety scores of 38.0 and 39.1 were slightly above the norms for male and female college undergraduates and well below the means of 48.5 each for patients with anxiety disorder\(^{27}\). These elevated levels suggest that this sample of workers enjoyed more social support but was slightly more anxious, had moderately more depressive symptoms and was markedly more hostile than the normal population at large—indicating that whatever selection factors entered into decisions to attend the workshop, this was a moderately distressed group of employees.

These results indicate that employees who participate in a workplace-based version of the Williams LifeSkills\(^{8}\) Workshop show highly reliable improvements following the training in psychosocial factors that have been shown to increase disability, workplace behavior problems, and risk of CVD and other major medical disorders. With the exception of the improvement in social support, these gains are maintained over a six month period following the training. These improvements were large in effect size. The clinical significance of these improvements is difficult to estimate with the limited data available and absence of any further follow-up data on this sample. It is noteworthy that levels of depressive symptoms assessed with the CES-D both after training and at 6-mo follow-up declined from a level that was 30% above published norms to a level that was well within the published norms. Because of company-imposed constraints this real-life observational study was limited to assessments that included only those who underwent the training, precluding our being able to assess a no treatment or some form of attention-placebo control group for comparison purposes. It was necessary to strike a balance between a rigorous randomized controlled study and the observational study that was possible given the field

| Table 1. Psychosocial risk factors before and within 2 wk after the LifeSkills workshop |
|---------------------------------|-----|-----|-----|-----|-----|
| Risk Factor | N   | Before Mean (SD) | After Mean (SD) | Time F (1df) | p    |
| CES-D       | 110 | 12.2 (9.7)      | 8.4 (7.6)       | 24.77 <0.0001 | 1.19 |
| ISEL        | 110 | 40.5 (6.2)      | 41.9 (5.5)      | 8.90 0.0035   | 0.79 |
| Hostility   | 94  | 4.4 (2.4)       | 3.5 (2.1)       | 21.43 <0.0001 | 1.23 |
| State Anx   | 94  | 38.1 (11.3)     | 33.7 (11.2)     | 23.99 <0.0001 | 1.17 |
| Trait Anx   | 94  | 39.4 (10.7)     | 35.3 (9.9)      | 34.29 <0.0001 | 1.49 |

d': effect size taking correlation between Before and After levels into account.

| Table 2. Psychosocial risk factors before, within 2 wk after, and 6 mo after the LifeSkills workshop |
|---------------------------------|-----|-----|-----|-----|-----|
| Risk Factor | N   | Before Mean (SD) | After Mean (SD) | 6 mo Mean (SD) | Time F (2df) | p    |
| CES-D       | 74  | 11.5 (9.2)       | 9.9 (8.1)       | 8.9 (9.7)      | 5.22 0.0065 | 0.77 |
| ISEL        | 74  | 40.9 (5.9)       | 41.9 (5.8)      | 41.3 (6.2)     | 1.23 0.294  | 0.18 |
| Hostility   | 61  | 4.2 (2.4)        | 3.6 (2.1)       | 3.2 (2.0)      | 10.50 <0.0001 | 1.19 |
| State Anx   | 61  | 38.0 (11.2)      | 33.9 (11.8)     | 34.6 (12.8)    | 6.04 0.003  | 0.71 |
| Trait Anx   | 61  | 39.4 (11.0)      | 35.6 (10.3)     | 34.5 (10.7)    | 11.51 <0.0001 | 1.31 |

d': effect size taking correlation between Before and 6-mo levels into account.
conditions. Despite the potential for elements of self-selection that could bias the results, it is important to note that recent research has shown that average results of observational studies are “remarkably similar to those of randomized, controlled trials (RCTs).” Moreover, it has been recently noted that while RCTs are necessary to demonstrate efficacy under carefully controlled conditions, observational trials can serve the important purpose of quantifying effectiveness of treatments under real world conditions. Indeed, participants in observational trials like the present one may more closely resemble the actual individuals who will actually be treated once the RCTs have documented efficacy.

That this may be case for the present study is suggested by the findings of similar effect sizes for improvements in psychosocial risk factors following LifeSkills training in carefully conducted randomized clinical trials by others and our group. Another limitation is the failure of 36 participants to complete the psychosocial assessments at six months follow-up.

Depression, anxiety and social support responses to the training were similar across gender and ethnic groups. The larger decrease in hostility among the men could be a result of their marginally higher starting levels. We have no ready explanation for the lack of change in hostility scores in the 23% who were minority group members. We can only speculate that a tendency that may have existed in this group to underreport negative emotions prior to training may have been lessened by the impact of the LifeSkills module on increased awareness of thoughts and feelings.

Within the context of a quality improvement study conducted for a corporate client, the present study is an example of T-2 field research that makes the case for the effectiveness of the LifeSkills Workshop by suggesting that its efficacy as demonstrated in randomized clinical trials generalizes to real world settings like the multiple work sites of a large corporate client widely scattered around the U.S. These findings suggest, therefore, that it is possible to translate a coping skills training intervention of demonstrated efficacy in reducing psychosocial risk factors in carefully conducted randomized clinical trials of heart patients into a commercial training product that can achieve similar benefits among moderately distressed non-patient groups of employees who receive the training at the worksite.

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References