

Evidence summary Title:

Effects of stress management in work settings: Evidence and implications for public health

Review Quality Rating: 7 (moderate)

Review on which this evidence summary is based:

Murphy, L.R. (1996). **Stress management in work settings: A critical review of the health effects.** *American Journal of Health Promotion*, 11 (2): 112-125.

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This is a evidence summary written to condense the work of the authors of this systematic review, referenced above. The intent of this summary is to provide an overview of the findings and implications of the full review. For more information on individual studies included in the review, please see the review itself.

Review content summary

This systematic review of articles aimed to determine the health effects of stress-management interventions implemented in work settings. Participants studied were: adults in occupational settings. To be included, studies were: identify inclusion criteria. Interventions described in this review stress-management techniques such as: muscle relaxation, meditation, biofeedback, cognitive-behavioural skills, and combinations of these techniques. Outcomes measured include: a) physiologic or biochemical measures such as blood pressure, adrenaline, noradrenaline, and cholesterol levels; b) psychologic or cognitive outcomes such as anxiety, depression, and irritability; c) somatic complaints such as nervousness, trouble sleeping, headaches, muscle tightness, shortness of breath; and d) job-related or organizational measures such as job satisfaction and absenteeism. The author report that the most positive results across various health outcomes were obtained with a combination of two or more techniques, however due to the number and range of techniques and outcome measures, as well as methodological variability between studies, the author was unable to draw firm conclusions. The author recommended that stress-management interventions become more comprehensive, and ideally include attention to both individual and organizational-level factors..

Comments on this review's methodology

This is a methodologically moderate systematic review. A focused clinical question was clearly identified. Appropriate inclusion criteria were used to guide the search. A comprehensive search was employed using health, social, psychological, and educational databases; reviewing reference lists of primary studies; handsearching key relevant journals; reviewing grey literature sources that include (list); contacting key informants. The search was limited by language (to which languages). Primary studies were assessed for methodological quality using the following quality criteria (list). The methods were described in sufficient detail so as to allow replication and two reviewers were involved in quality appraisal. Any discrepancies in appraisal results were rectified by discussion. The results of this review were transparent. Results were clearly presented in graphical form so as to allow for comparisons across studies. Heterogeneity was assessed. Appropriate analytical methods (fixed effects, random effects) were employed to enable the synthesis of study results. Add other findings of the critical appraisal as appropriate (based on the methodological requirements for systematic review or meta-analyses). Also mention inconsistencies among studies in terms of design, interventions, outcomes and populations. Some authors may set out some of these shortcomings, but do not rely solely on their narrative.

Why this issue is of interest to public health

Although the exact mechanisms with which stress impacts health are not fully understood, it is thought that the negative emotional and cognitive effects of stress alter the immune response and increase susceptibility to disease¹. Physical signs of stress vary, including: stomach aches, diarrhea, headaches, sleep problems, depression, loss of appetite, skin conditions, high blood pressure, muscle tightening or muscle spasms^{2,3}. Prolonged periods of stress may lead to higher blood cholesterol levels, increased blood pressure, development of atherosclerosis (narrowing of the arteries)⁴, diabetes, asthma, migraines, ulcers⁵, and mental health problems, such as depression and anxiety⁴, making stress management a public health issue. A 2006 study funded by the Heart and Stroke Foundation found that when subjects experienced job strain, their systolic blood pressure went up over the course of a year in both men and women⁴; high blood pressure is the number one cause of stroke and a major risk factor for heart attack. Individual responses for coping with stress, such as smoking, making unhealthy food choices, increasing alcohol consumption, or omitting physical activities may further impact susceptibility to disease. The link between job characteristics, such as low level of control and work overload, to job stress is well established². In Canada, work-related stress has a direct bearing on the current and long-term productivity of workers in terms of reduced work activities, disability days and absenteeism⁵. In the 2002 Canadian Community Health Survey examining the impact of work stress on workers, high self-perceived work stress was strongly related to employee disability days. Almost one in five men and women who perceived their regular work days to be stressful took at least one disability day during the two week period preceding the survey⁵. A supportive work environment, including increased flexibility, responsibility, and learning opportunities, may offer workers greater potential for self-direction, skill development, and career growth, leading to reduced stress and

increased satisfaction and wellbeing², and can mitigate job interruptions due to stress⁵. Stress management interventions, including those reviewed in this evidence summary, may be useful in minimizing the long term health impacts and productivity losses due to job related stress.

Evidence and implications

Evidence points are in order of the strength of evidence

What's the evidence?	Implications for practice and policy:
<p>1. Progressive muscle relaxation (PMR) (13 studies) PMR involves focusing on muscle activity to identify tension in muscle groups and practicing releasing tension from those muscles.</p> <p>1.1. Across these 13 studies the following outcomes were assessed</p> <ul style="list-style-type: none"> 1.1.1. Physiologic/biochemical (assessed 6 times) <ul style="list-style-type: none"> 1.1.1.1. Desired treatment effects were noted in 83% of assessments 1.1.2. Psychologic/cognitive (assessed 8 times) <ul style="list-style-type: none"> 1.1.2.1. Desired treatment effects were noted in 50% of assessments 1.1.3. Job/organizational (assessed 4 times) <ul style="list-style-type: none"> 1.1.3.1. Desired treatment effects were noted in 25% of assessments <p>1.2. Reported in this review</p> <ul style="list-style-type: none"> 1.2.1. In five of six studies, participants in treatment groups were significantly more likely to have reductions in physiologic outcomes (e.g., blood pressure, muscle activity levels) compared with those in control groups 1.2.2. There was no difference between treatment and control groups on any other outcome measure (e.g., somatic or organizational outcomes). 	<p>1. Progressive muscle relaxation</p> <ul style="list-style-type: none"> 1.1. PMR can be effective in reducing physiologic outcomes associated with stress, however it does not appear to be effective in addressing other stress-related outcomes <ul style="list-style-type: none"> 1.1.1. Public health organizations should consider PMR only as part of a comprehensive strategy to reduce workplace stress and associated outcomes. 1.1.2. Rigorous program evaluations should be conducted to determine the short and long term benefits of these comprehensive approaches. 1.1.3. Additional high quality research should also be conducted to add to the existing body of knowledge related to this health issue
<p>2. Meditation (6 studies) (4 RCTs) This strategy involves sitting in a quiet place for 20 minutes twice a day, and repeating a word of personal significance on their exhale, while maintaining a passive attitude toward intruding thoughts.</p> <p>2.1. Across these 6 studies the following outcomes were assessed</p> <ul style="list-style-type: none"> 2.1.1. Physiologic/biochemical (assessed 3 times) <ul style="list-style-type: none"> 2.1.1.1. Desired treatment effects were noted in 100% of assessments 2.1.2. Psychologic/cognitive (assessed 3 times) <ul style="list-style-type: none"> 2.1.2.1. Desired treatment effects were noted in 100% of assessments 2.1.3. Somatic complaints (assessed 3 times) <ul style="list-style-type: none"> 2.1.3.1. Desired treatment effects were noted in 100% of assessments 2.1.4. Job/organizational (assessed 3 times) <ul style="list-style-type: none"> 2.1.4.1. Desired treatment effects were noted in 100% of assessments <p>2.2. Multiple outcome measures were used across studies, such that for any one outcome measure, results were drawn from a maximum of three studies</p>	<p>2. Meditation</p> <ul style="list-style-type: none"> 2.1. Meditation in the workplace can be effective in addressing stress. Therefore, public health organizational may wish to include meditation as part of a workplace stress-reduction program. However due to the limited amount of evidence available on this strategy: <ul style="list-style-type: none"> 2.1.1. Rigorous program evaluations should be conducted to determine the short and long term benefits of these specific mediation strategies. 2.1.2. Additional high quality research should also be conducted to add to the existing body of knowledge related to this health issue
<p>3. Biofeedback (4 studies) This strategy involves the use of tones to allow tension in muscles to be detected. The participant learns over time that higher tones means higher muscle tension and that they should act to decrease tension (e.g. progressive muscle relaxation)</p> <p>3.1. Across these 4 studies the following outcomes were assessed</p> <ul style="list-style-type: none"> 3.1.1. Physiologic/biochemical (assessed 3 times) <ul style="list-style-type: none"> 3.1.1.1. Desired treatment effects were noted in 60% of assessments 3.1.2. Psychologic/cognitive (assessed twice) <ul style="list-style-type: none"> 3.1.2.1. Desired treatment effects were never noted in these assessments 3.1.3. Somatic complaints (assessed twice) <ul style="list-style-type: none"> 3.1.3.1. Desired treatment effects were never noted in these assessments 	<p>3. Biofeedback</p> <ul style="list-style-type: none"> 3.1. This evidence suggests that biofeedback is not an effective workplace intervention for stress-reduction nor is it a feasible intervention for workplace-based stress reduction efforts

<p>3.1.4. Job/organizational (assessed 3 times)</p> <p>3.1.4.1. Desired treatment effects were never noted in these assessments</p> <p>3.2. Participants in the treatment groups were no more or less likely to be assessed as having desired outcome in either of the following outcome categories</p> <p>3.3. Cost of biofeedback equipment and requirement for certified personnel were reported to be prohibitive to workplace use of this technique</p>	
<p>4. Cognitive-behavioural skills training (CBT) (13 studies)</p> <p>This strategy involves teaching participants to modify how they determine the stressfulness of situations, and helps them develop behavioural skills for managing stressors.</p> <p>4.1. Across these 13 studies the following outcomes were assessed</p> <p>4.1.1. Physiologic/biochemical (assessed 4 times)</p> <p>4.1.1.1. Desired treatment effects were noted in 50% of assessments however outcomes were reported to be “mediocre”</p> <p>4.1.2. Psychologic/cognitive (assessed 10 times)</p> <p>4.1.2.1. Desired treatment effects were noted in 100% of assessments, especially in anxiety-related outcomes</p> <p>4.1.3. Somatic complaints (assessed 3 times)</p> <p>4.1.3.1. Desired treatment effects were noted in 100% of assessments</p> <p>4.1.4. Job/organizational (assessed 5 times) (only 2 of 5 studies were RCTs)</p> <p>4.1.4.1. Desired treatment effects were noted in 80% of assessments</p>	<p>4. Cognitive-behavioural skills training (CBT)</p> <p>4.1. CBT appears not to be an effective workplace intervention for reducing physiological/biochemical symptoms of stress</p> <p>4.2. CBT appears to be effective in reducing</p> <p>4.2.1. anxiety and other psychological or cognitive symptoms of stress</p> <p>4.2.2. somatic stress-related complaints</p> <p>4.3. CBT may be effective in reducing job stress and other organizational outcomes, but this evidence is based on limited number of quality studies.</p> <p>However, due to the difficulty interpreting the evidence given the lack of effect size analyses, it is difficult to determine this effectiveness.</p> <p>Should public health organizations wish to include CBT as part of workplace-based stress reduction initiatives, rigorous program evaluations should be conducted.</p> <p>Additional high quality research studies should be conducted to add to the body of knowledge to inform decision making in this area.</p>
<p>5. Combination of interventions (30 studies)</p> <p>Participants receiving a combination of interventions were significantly more likely to experience desired changes in outcomes across all outcome categories</p> <p>5.1. Across these 13 studies the following outcomes were assessed</p> <p>5.1.1. Physiologic/biochemical (assessed 13 times)</p> <p>5.1.1.1. Desired treatment effects were noted in 62% of assessments</p> <p>5.1.2. Psychologic/cognitive (assessed 21 times)</p> <p>5.1.2.1. Desired treatment effects were noted in 76% of assessments</p> <p>5.1.3. Somatic complaints (assessed 13 times)</p> <p>5.1.3.1. Desired treatment effects were noted in 85% of assessments</p> <p>5.1.4. Job/organizational (assessed 11 times)</p> <p>5.1.4.1. Desired treatment effects were noted in 64% of these assessments</p>	<p>5. Combination of interventions</p> <p>5.1. Due to the difficulty interpreting the evidence given the lack of effect size analyses, it is unclear whether or not a combination of interventions is effective in reducing</p> <p>5.1.1. Physiologic/biochemical symptoms of stress</p> <p>5.1.2. anxiety and other psychological or cognitive symptoms of stress</p> <p>5.1.3. somatic stress-related complaints</p> <p>5.1.4. job stress and other organizational outcomes</p> <p>Should public health organizations wish to include a combination of symptoms as part of workplace-based stress reduction initiatives, rigorous program evaluations should be conducted. Additional high quality research studies should be conducted to add to the body of knowledge to inform decision making in this area.</p>
<p>6. Muscle relaxation and CBT (13 studies)</p> <p>Muscle relaxation together with CBT was the most common combination of techniques assessed in this review</p> <p>6.1. Physiologic/biochemical (assessed 7 times)</p> <p>6.1.1. Desired treatment effects were noted in 57% of assessments</p> <p>6.2. Psychologic/cognitive (assessed 11 times)</p> <p>6.2.1. Desired treatment effects were noted in 73% of these assessments</p> <p>6.3. Somatic complaints (assessed 6 times)</p> <p>6.3.1. Desired treatment effects were noted in 83% of assessments</p> <p>6.4. Job/organizational (assessed 6 times)</p> <p>6.4.1. Desired treatment effects were noted in 67% of these assessments</p>	<p>6. Muscle relaxation and CBT</p> <p>6.1. Due to the difficulty interpreting the evidence given the lack of effect size analyses, it is not clear whether or not interventions combining muscle relaxation and CBT is effective in reducing</p> <p>6.1.1. Physiologic/biochemical symptoms of stress</p> <p>6.1.2. anxiety and other psychological or cognitive symptoms of stress</p> <p>6.1.3. somatic stress-related complaints</p> <p>6.1.4. job stress and other organizational outcomes</p> <p>Should public health organizations wish to include a combination of muscle relaxation and CBT as part of workplace-based stress reduction initiatives, rigorous program evaluations should be conducted.</p> <p>Additional high quality research studies should be conducted to add to the body of knowledge to inform decision making in this</p>

<p>7. Other interventions (17 studies) These include interventions that do not fit into other categories such as posttraumatic debriefing sessions, writing about traumatic events, worker social support programs, health education interviews, & brief psychodynamic therapy</p> <p>7.1. Physiologic/biochemical (assessed 4 times) 7.1.1. Desired treatment effects were noted in 50% of assessments</p> <p>7.2. Psychologic/cognitive (assessed 12 times) 7.2.1. Desired treatment effects were noted in 77% of these assessments</p> <p>7.3. Somatic complaints (assessed 8 times) 7.3.1. Desired treatment effects were noted in 75% of assessments</p> <p>7.4. Job/organizational (assessed 6 times) 7.5. Desired treatment effects were noted in 83% of these studies</p>	<p>area.</p> <p>7. Other interventions Due to the multiple interventions including in this category and the difficulty interpreting the evidence given the lack of effect size analyses, there is not sufficient evidence to determine whether these interventions are effective in reducing</p> <p>7.1. Physiologic/biochemical symptoms of stress 7.2. Anxiety and other psychological or cognitive symptoms of stress 7.3. Somatic stress-related complaints 7.4. Job stress and other organizational outcomes</p> <p>Should public health organizations wish to include these other interventions as part of workplace-based stress reduction initiatives, rigorous program evaluations should be conducted. Additional high quality research studies should be conducted to add to the body of knowledge to inform decision making in this area.</p>
<p>8. Methodological Issues with the Primary Studies in the Review</p> <p>8.1. Failure to use appropriate statistical analyses (20% of studies) 8.2. Inadequate power to detect statistically significant treatment effects 8.2.1. Small sample sizes (25% of studies) 8.3. Lack of long term follow-up 8.3.1. Any post-treatment follow up (50% of studies) 8.3.2. Follow-up up to one year post treatment (4 studies) 8.4. Lack of control or comparison group (25% of studies) 8.5. Lack of random assignment (25% of studies) 8.6. Failure to control for “non-specific effects” 8.7. Use of multiple outcome measures 8.8. Failure to use standardize measures for certain outcomes 8.9. Failure to report the results of statistical analyses related to the significance of treatment effects</p>	<p>8. Implications for Future Research</p> <p>8.1. Rigorous program evaluation and quality research studies should be conducted to address the methodological shortcomings noted among primary studies included in this review 8.2. Given that this review was developed in 1996, an update of this review should be conducted in order to determine the current state of the evidence on this issue in order to more effectively make decisions based on the best available evidence in this area.</p>
<p>9. Cost Benefit or Cost-effectiveness Information</p> <p>9.1. Health care costs were evaluated in three of the 64 studies included in this review. All three report significant decreases in cost following stress management training using a combination of techniques. However, only one of these three studies was a randomized controlled trial</p>	<p>9. Cost Benefit or Cost-effectiveness Information</p> <p>9.1. Future research should assess cost benefit or cost-effectiveness of the interventions</p>
<p>General Implications</p> <ul style="list-style-type: none"> • CBT appears to be effective in reducing anxiety and other psychological or cognitive symptoms of stress and somatic stress-related complaints. As well, it may be effective in reducing job stress and other organizational outcomes, but this evidence is based on limited number of quality studies. • Due to the difficulty interpreting the evidence given the lack of effect size analyses provided in this review, there is not sufficient evidence to determine whether other workplace-based stress-reduction intervention approaches are effective. • Rigorous program evaluation and quality research studies should be conducted to address the methodological shortcomings noted among primary studies included in this review • Given that this review was developed in 1996, an update of this review should be conducted in order to determine the current state of the evidence on this issue in order to more effectively make decisions based on the best available evidence in this area. 	
<p>Legend: CI – Confidence Interval; OR – Odds Ratio; RR – Relative Risk **For definitions please see the healthevidence.org glossary</p>	

References used to outline issue

1. Statistics Canada (2001). *Stress and well-being*. Health Reports, 12(3): 21-32. Retrieved from <http://www.statcan.ca/english/studies/82-003/archive/2001/12-3-b.pdf>.
2. Sauter, S.L., Brightwell, W.S., Colligan, M.J., Hurrell, J.J., Katz, T.M., LeGrande, D.E., Lessin, N., Lippin, R.A., Lipscomb, J.A., Murphy, L.M., Peters, R.H., Keita, G.P., Robertson, S.R., Stellman, J.M., Swanson, N.G., Tetric, L.E. (2002). The changing organization of work and the safety and health of working people: Knowledge gaps and research directions. Publication No. 2002-116. Cincinnati, OH: National Institute for Occupational Safety and Health (NIOSH). Retrieved from <http://www.cdc.gov/niosh/docs/2002-116/>
3. Heart & Stroke. (2008). *Reduce your stress*. Retrieved from <http://www.heartandstroke.com/site/c.ikiQLcMWJtE/b.3484175/>
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5. Statistics Canada. (2007). Study: Work stress and job performance. The Daily. Wednesday December 19, 2007. Retrieved from <http://www.statcan.ca/Daily/English/071219/d071219d.htm>

Other quality reviews on this topic

- Engbers, L.H., van Poppel, M.N., Chin A Paw, M.J., van Mechelen, W. (2005). Worksite health promotion programs with environmental changes: A systematic review. *American Journal of Preventive Medicine*, 1, 61-70.
- Proper, K.I., Staal, B.J., Hildebrandt, V.H., van der Beek, A.J., van Mechelen, W. (2002). Effectiveness of physical activity programs at worksites with respect to work-related outcomes. *Scandinavian Journal of Work, Environment & Health*, 28, 75-84.
- Michie, S., Williams, S. (2003). Reducing work related psychological ill health and sickness absence: A systematic literature review. *Occupational and Environmental Medicine*, 60, 3-9.

Related links

- National Institute for Occupational Safety and Health (NIOSH), Stress at Work <http://www.cdc.gov/niosh/topics/stress/>
- Heart & Stroke Foundation
 - Reduce Your Stress: <http://www.heartandstroke.com/site/c.ikiQLcMWJtE/b.3484175/>
 - Stop That Stress: http://www.heartandstroke.com/site/c.ikiQLcMWJtE/b.3958099/k.AF58/Stop_that_stress.htm
- Human Resources and Social Development Canada, Work-life stress management (Workplace programs, policies and practices): http://www.hrsdc.gc.ca/eng/lp/spila/wlb/wppp/04worklife_stress_management.shtml
- Centre for Addiction and Mental Health (CAMH), Work, Stress and Health Program: http://www.camh.net/About_CAMH/Guide_to_CAMH/Mental_Health_Programs/Mood_and_Anxiety_Program/guide_work_stress_health.html
- Statistics Canada, 2007 Canadian Community Health Survey (CCHS): <http://www.statcan.ca/cgi-bin/imdb/p2SV.pl?Function=getSurvey&SDDS=3226&lang=en&db=imdb&dbg=f&adm=8&dis=2>

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