Multi-sensory Stress Management Program© Reduces Stress, Improves Heart-Rate Variability, Blood Pressure and Improves Work Performance.

©Dr Stanley Rodski, Neuroscientist.

Participation in this multisensory stress-management program significantly reduced stress, improved heart-rate variability, decreased blood pressure in office workers and improved work performance.

Work stress elevation was seen to increase cardiovascular risk either indirectly, by inducing unhealthy life styles, or directly, by adversely affecting the autonomic nervous system and arterial pressure.

We hypothesized that before any apparent sign of disease, work-related stress is already accompanied by alterations of RR [relative risk], variability profile and that the Multi-sensory Stress Management Program based on cognitive restructuring could reduce the level of stress symptoms, [reverse] stress-related autonomic nervous system dysregulation, lower arterial pressure and improve job performance.

The study compared 91 white-collar workers in a stressful situation because of work downsizing, with 79 healthy control subjects. Psychological profiles were evaluated with questionnaires, and autonomic nervous system dysregulation was assessed using HRV(Heart rate variation) analysis of RR variability. A multi-sensory stress management program consisting of cognitive restructuring was provided to a subgroup of workers; a sham program was given to another subgroup.

The multi-sensory stress management program required the test group to participate every day for 30 days. Participation required 12 minutes at any time of the day. In the 12 minutes participants would:

- Listen to alpha sound waves(soundscience) on headphones connected to their phone.
- While listening they would colour-in using brain based designs and
- Drink and smell a cup of tea (peppermint).

Compared with control subjects, workers had a higher level of stress-related symptoms and an altered variability profile (low-frequency component of RR variability, 65.2 ± 2 vs 55.3 ± 2 normalized units; $P < .001$; opposite changes were observed for the high-frequency component).

Participation in the Multi-sensory Stress Management Program was associated with a reversal in these changes (low-frequency component of RR variability from 63.6 ± 3.9 to 49.3 ± 3 normalized units; $P < .001$) and with a slight decrease in systolic arterial pressure. No changes were observed in the group participating in the sham program.

This stress study indicated that work stress is associated with undesirable symptoms and with an altered autonomic profile and suggests that the multi-sensory stress management program could be implemented at worksites, and indeed anywhere with possible preventive advantages for hypertension(stress) development.

Study limitations included potential self-selection bias; autonomic assessment limited to HRV analysis of RR variability.

Stress is a fundamental experience of modern work, and several models have been used to provide a formal description of their relationship in an attempt to design organisation-wide programs of intervention capable of minimizing the impact of stress on organizational, economic, and health outcomes.

 The present investigation provides a potential model for the improvement of work-related stress at an individual level; in addition, it suggests that the Multi-sensory stress management Program can be implemented at worksites and home, with a capacity to reduce the stress symptoms level, revert stress-related [autonomic nervous system] dysregulation, and lower resting arterial pressure. The practical long-term impact of this approach on symptoms, well

being, and health of interested workers will require specific longitudinal studies on large populations which are being initiated.

Clinical Context

Psychosocial factors, including job stress, have a profound effect on cardiovascular morbidity and mortality and may predispose to acute myocardial infarction. The mechanisms linking job stress to cardiovascular risk are complex and probably related to the autonomic nervous system. Noninvasive techniques, such as a spectral analysis of electrocardiogram RR variability profile for the low- and high-frequency components are measures of autonomic nervous system dysregulation that can be used to assess the impact of job stress and psychological measures. Heart rate variation(HRV) analysis was used and found to have high efficacy in the measurement of both parasympathetic and sympathetic nervous systems. Particularly in terms of their relationship to hypertension and stress.

The research represents an open study of 170 subjects, consisting of a stressed group of workers (n = 91) and unstressed controls (n = 79), to examine the association between autonomic nervous system measures and job stress and the impact of the Multi-sensory Stress Management Program during 1 month on job-stress measures. Stressed workers were divided into 2 groups: the test group underwent the daily Multi-sensory stress management program at work; the other (control group) received passive materials.

Study Highlights

- Stressed workers comprised 91 workers (mean age, 40 years; body mass index [BMI], 23.6 kg/m^2; 59 men; 32 women) of an Australian company undergoing a 10% layoff.
- Controls comprised 79 healthy volunteers outside the company who did not complain of any stress (mean age, 38 years; BMI, 23.2 kg/m^2; 53 men; 27 women).
- Excluded were those with psychiatric illness.
- Stress evaluation was conducted by a psychologist and participants completed the Subjective Stress-Related Somatic Symptom Questionnaire (4S-Q) to self-rate overall stress, tiredness perception, and stress-related symptoms.
- The 4S-Q, with 18 somatic symptoms, has a score from 0 (no stress) to 180 (most stress).

- Autonomic nervous system evaluation was conducted after 10 minutes of rest, and subjects were instructed to avoid caffeine and alcohol for 12 hours and to refrain from heavy physical activity within 24 hours.
- Workers were studied in an office at the worksite and HRV analysis was performed in the recumbent and standing positions.
- RR variability and blood pressure were measured.
- After the measurements, the stressed group was subdivided into 2 groups.
- Test group (n = 26; age 43.5 years; BMI, 22.7 kg/m^2; 8 men) chose to participate in the Multi-sensory Stress Management Program for 1 month.
- The Multi-sensory Stress Management Program required participation every day for 30 days. The stress program required 12 minutes participation at any time of the day. In the 12 minutes participants would listen to alpha sound waves(soundscience app) on headphones connected to their phone. While listening they would colour-in using brain based designs (Rodski brain science colouring book) and have a cup of tea (peppermint).
- The other group (n = 25; mean age, 42.7 years; BMI, 23.7 kg/m^2; 18 men) chose to participate in a sham program, consisting of weekly emails and articles about stress.
- Measures of stress were repeated at the end of 1 month.
- Primary outcomes were stress measures by self-report (4S-Q score) and autonomic nervous system measures of stress (RR variability and blood pressure).
- The stressed group reported both work and personal stress, whereas the control unstressed group reported no significant sources of stress.
- Workers showed significantly higher perception of stress and tiredness than controls (5.2 vs 2.9 and 5.3 vs 3.3 for stress and tiredness, respectively; $P < .001$).
- RR interval, HRV variability, and systolic and diastolic blood pressure were similar in the 2 groups.
- The low-frequency component of the RR interval was higher in stressed workers, whereas the high-frequency component was lower ($P < .001$ for both).
- Stress-perception scores correlated significantly with low-frequency normalized unit, high-frequency normalized unit, and low frequency/high frequency at rest.
- After 1 month, those who participated in the Multi-sensory Stress Management Program showed a significantly lower perception of

stress (6.65 before vs 5.14 after) and tiredness (6.05 before vs 5.14 after).
- The sham-program group showed the same scores before and after the passive program.
- The Multi-sensory Stress Management Program induced a small reduction in systolic arterial blood pressure and normalized the low-frequency and high-frequency components of the RR variability.
- Thus, there was a significant overall effect of stress on autonomic parameters, which was reversed with the multi-sensor stress management program treatment.
- After 1 month, all participants (including control group) were reviewed in terms of work performance. Significant improvements were found with the stressed (test) group achieving a work performance improvement of 18% (P< .001).

Summary

- Job-related stress is associated with an elevated level of subjective symptoms and altered autonomic profile.
- The Multi-sensor stress management program is associated with reduction in subjective stress symptoms and normalization of the autonomic profile in stressed office workers.
- Reduction in subjective stress symptoms lead to improved work performance.