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STRESS REDUCTION THROUGH YOGA NIDRA

Summary*: Relaxation procedures have been receiving growing attention and interest of researchers in the field of health psychology. In the present study one such procedure, Yoga Nidrā, was studied for its effectiveness in reducing stress. Yoga Nidrā consists of resolve making, deep muscle relaxation, breathing exercises and imagery. 95 working mothers were randomly assigned to an experimental (N = 42) or a no treatment control group (N = 53). The experimental group received 30 sessions of Yoga Nidrā, over a one-and-a-half month period. Smith Stress Symptoms Inventory, blood pressure, plasma glucose and haemoglobin were selected as parameters of stress. Pre-test as well as post-test measures were taken. Univariate Analysis of Covariance, holding pre-test scores as covariates revealed that the Yoga Nidrā group was significantly lower than the control group on several parameters. Among those that showed a difference with treatment at both State and Trait levels were Autonomic arousal, Attentional deficit, Depression and Striated muscle tension. Two parameters, Worry and negative emotion and Interpersonal conflict and anger showed a difference only at the State level. Blood Pressure, Systolic and Diastolic decreased, while Haemoglobin levels increased after treatment. However, since the homogeneity of covariate variance assumption was violated for some of the parameters at the State level, viz., Worry and negative emotion, Attentional deficit, Autonomic arousal and anxiety, Striated muscle tension, Interpersonal conflict and anger and haemoglobin, these results have to be accepted with caution. The variance of the glucose scores of the experimental group reduced after treatment while that of the control group did not, as was expected.*

Key words: *yoga, nidra, stress, resistance, attention, behavioral medicine.*

Within the area of health psychology, increasing attention has been focussed on behavioural medicine, an area of research and practice that integrates behavioural techniques with the science and application of medicine in order to promote health and prevent, diagnose and treat disease (Masters, Burish, Hollon & Rimm, 1987). The stress-illness link became well established by the middle of the last century, after which researchers turned to various stress reduction techniques to find out whether a decrease in mental stress leads to better health, and to an improved quality of life (Blumenthal & Emery, 1988). Among the many techniques that were so investigated and continue to be investigated because of their promising results, were relaxation strategies, exercise, meditation, biofeedback, and cognitive interventions. Yoga Nidrā is one such relaxation procedure, propounded by Swami Satyananda Saraswati from Bihar School of Yoga, Munger, Bihar, India. Deep muscle relaxation, observation of the breath, and imagery are the key elements of the technique (Swami Satyananda Saraswati, 1998). The present study attempted to investigate the effectiveness of this practice in alleviating stress.

Continuous exposure to stress affects the body in at least three ways: one, by affecting the central and peripheral nervous system, two, the endocrine system and three, the immune system. Stress results in a decline in the body's overall level of biological functioning due to constant secretion of stress related hormones. Over time, stressful reactions can promote deterioration of body tissues such as blood vessels and the heart. Ultimately we become more susceptible to diseases (Cohen, Tyrell & Smith, 1991).

Relaxation has been the most widely researched topic in the area of alternative medicine to counteract the effects of stress. Relaxation techniques are essentially aimed at reducing arousal in the

central as well as the autonomic nervous system, thereby restoring or promoting physical as well as psychological well being.

Exactly how relaxation works to reduce stress is not fully known. But perhaps the best theoretical explanation comes from McGuigan (1984). He says that the mind and the body are two complex interacting systems directly influencing each other. Thus whenever we think, we begin by tensing the muscles of the eyes and the speech regions. Similarly during times of emotion, there is a tension in selected muscles of the body. Hence, by learning to control muscle tension, we can learn to control mental activity and emotion, via changes in the activation of neuromuscular circuits. Wolpe (1982) suggests that in deep muscle relaxation, a state is produced in the autonomic activity that is physiologically incompatible with anxiety. So to the extent that a person's problems are due to anxiety, he can learn to control them through relaxation.

Relaxation training can be used as an easy and effective method in nursing practice. Several other studies have shown the effectiveness of relaxation in reducing sympathetic nervous system activity (for example, Candill, Friedman & Benson, 1987; Davison, Williams, Nezami, Bice & DeQuattro, 1991; Deabler et al., 1973; Jacob, Chesney, Williams, Ding & Shapiro, 1991; Hoffman, et al., 1982; Nakao et al., 1997; Sanderlin, 1991). Relaxation alone has also been shown to have a positive effect on the functioning of the immune system in an elderly population by Kiecolt-Glaser and colleagues (Kiecolt-Glaser et al, 1985). The effect of humour and laughter on immune function and resilience to stress have also received attention (Berk et al., 1989).

Several studies have supported the role relaxation training, of any kind, plays in the treatment of anxiety. In one study, progressive and imaginal relaxation training was used for persons with subjective anxiety. Elderly persons exposed to either of the relaxation procedures reported significant improvement on measures of personal functioning. (Scogin et al., 1992). Progressive muscle relaxation, yogic postures and imagery are all methods, which induce a state of relaxation. In a study subjects who took part in the relaxation exercises reported that they were calmer and were able to cope better with anxiety (Khasky & Smith, 1999).

Systematic relaxation helps subjects to learn the art of relaxing the muscles, which remain slightly tensed throughout the day, producing fatigue. When subjects master the art of relaxation at will, they generalise it to other stress producing situations as well. This is one major reason why subjects report decreased levels of stress after being trained in the art of relaxation. Besides, imagery helps them to visualise positive and relaxing scenes thereby reducing stress. Tsai (1993), or instance, reported positive results of relaxation training combining meditation and guided imagery on self-perceived stress among Chinese nurses in large teaching hospitals in Taiwan.

Yoga Nidrā: A special case of relaxation

The concept of Yoga Nidrā was first propounded by Swami Satyananda Saraswati from Bihar School of Yoga, Munger, Bihar, India. It is designed as a guided relaxation technique, for the beginning practitioner, who finds it difficult to maintain a passive focus. An experience of most people who begin to practice meditation is that there is an automatic pull to think, which makes it difficult to experience centered states. To avoid this pitfall Yoga Nidrā is composed of a set of instructions that guide the practitioner toward progressively deeper relaxation states.

Theoretically, Yoga Nidrā is rooted in the model of Pança Koshas or Five Layers. In this model every human being is thought of as existing on five sheaths or layers. The outermost is the body Annamaya, then the sheath of breath or vitality Prāṇamaya, then that of the mind (thoughts and feelings) Manomaya, then the astral or psychic plane Vijňānamaya (phenomena such as telepathy, clairvoyance, premonitions etc are thought to arise from this sheath) and finally the subtlest level of pure consciousness, Ānandamaya kosha. Instructions, therefore, follow the sequence of deep muscle relaxation, followed by observation of the breath, awareness and release of feelings, creative visualization and finally the experience of silence. The practitioner is then gradually brought back to normal wakefulness.

An important aspect of Yoga Nidrā is the resolve or Sankalpa. The resolve is a short positive mental statement that the practitioner is asked to formulate at the beginning of the relaxation process, according to what he/she wants to achieve out of the practice. Practitioners' goals could range from getting rid of addictions, to achieving good health to being able to perform at an examination. It is assumed that one's doubts and fears (called Vikalpas), deeply rooted in the unconscious recesses of the mind, impede one's achievement of goals. During the practice of Yoga Nidrā one's mind becomes silent and highly suggestible. Hence after the creative visualization, the practitioner is asked to recall the statement of the resolve. This allows the resolve to become engraved in the mind, leading to positive changes in the person's life (Swami Satyananda Saraswati, 1998).

Very few studies have been carried out in the past to investigate the stress-alleviating capacity of Yoga Nidra, though the technique holds a lot of promise. Some studies have been conducted with students who have test anxiety, pregnant women and alcoholics, but most of them have not been done using proper and equivalent control groups.

Method

Sample for this research has been made of 95 married women with children, working as primary school teachers were. They had all assembled for a two-month residential training program for teachers. They were randomly assigned to either an experimental (N= 42) or a no-treatment control (N= 53) group. (Initially there were 55 participants in each group but data could be collected on 95 participants as some of them had to drop out of the study before the post test). They were all in the age group of 30 to 45 years. All of them were form low socio-economic status and their work involved hectic teaching schedules plus home visits to motivate illiterate families to send their children to elementary school. One of the reasons that a few participants could not complete the relaxation programme was that they were suffering from low blood pressure and relaxation is contraindicated for such participants.

As a psychological measure, the Smith Stress Symptoms Inventory (SSSI), developed by Jonathan C. Smith (2002)[1] was used. This was used as a pre-test as well as post-test measure. This inventory uses the state-trait approach to stress. There are 70 items in all, 35 in the Trait category and 35 in the State category. There are 6 subscales, developed from the common stress symptoms reported by people. The scale was based on the Smith Stress Costs Inventory (Smith, 1992) and was developed through factor analysis, to measure frequently reported stress symptoms. It was standardised on a sample of 952 college students, 281 male students, 615 females and 56 were unstated. The mean age was 26.57 and sd 8.57. The six stress symptom categories are: *Worry and negative emotion* (WNE), *Autonomic arousal and anxiety* (AAA), *Attention deficit* (AD), *Depression* (D), *Striated muscle tension* (SMT), and *Interpersonal conflict and anger* (ICA). Each subscale yields a state measure and a trait measure. Each item has to be answered on a four-point rating scale ranging from 1 to 4. The Alpha reliabilities for symptom categories range from .76 to .89. *Worry and Negative emotion*: (alpha = .89), *Autonomic arousal and anxiety*: (alpha = .80), *Attentional deficit*: (alpha =.79), *Striated Muscle tension*: (alpha = .76), *Depression*: (alpha =.79), *Interpersonal conflict and anger*: (alpha = .77).

This scale was translated into Marathi (the local language) with the forward backward method, for the benefit of the subjects of this study. It was then administered to a sample of 200 Marathi speaking people in Pune city in the age range of 30 to 45 years, 100 males and 100 females. The Alpha reliabilities of each of the subscales were as follows:
Worry and Negative emotion: (alpha = .89), Autonomic arousal and anxiety: (alpha = .76), Attentional deficit: (alpha = .73), Striated Muscle tension: (alpha = .72), Depression: (alpha = .74), Interpersonal conflict and anger: (alpha = .58).
The Physiological measures were: Blood pressure, Blood glucose levels, and Haemoglobin.

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[1] Smith Stress Symptoms Inventory © 2002, Jonathan C. Smith. Permission was granted for translation and use of the inventory for the present study only.

Intervention

All the subjects completed the Smith Stress Symptoms Inventory. They were pre-tested for blood pressure (an average of three measures was taken for each participant), blood glucose (random) and haemoglobin. Subjects who had low blood pressure were screened out. They were then randomly assigned to either an experimental or a control group.

The experimental group received 30 sessions of Yoga Nidra, each session of half an hour, delivered via a pre-recorded audio tape in female voice. The instructions included resolve making, deep muscle relaxation, observation of breath, evoking sensations of warmth and cold, pleasure and pain, heaviness and lightness in quick successions, creative visualization, recalling the resolve and gradual reawakening. The control group did not receive any treatment.

Both the groups were tested again after one and a half months on the Stress Symptoms Inventory, blood pressure, heart rate, blood glucose and haemoglobin. They were debriefed about the procedure and their doubts answered after the experimental period. The diet was uniform for both the groups for the experimental period.

Results

Univariate Analysis of Covariance holing pre test scores as the covariates was carried out. The test of homogeneity of covariate variance was carried out to test whether the two groups were equivalent before treatment.

Table 1. Pre-treatment equivalence of the two groups

HOMOGENITY OF COVARIATE VARIANCE					
Source (Interaction)	df	m.s.	F	sig	eta
group * WNETX	1	0.501	2.644	0.107	0.028
group * WNESX	1	1.281	6.606	0.012	0.068
group * ADTX	1	0.225	1.068	0.304	0.012
group * ADSX	1	1.098	5.539	0.021	0.057
group * AAATX	1	2.03	0.000	0.999	0.000
group * AAASX	1	2.203	15.448	0.000	0.145
group * SMTTX	1	0.805	2.515	0.116	0.027
group * SMTSX	1	3.029	8.427	0.005	0.085
group * DTX	1	1.254	3.341	0.071	0.035
group * DSX	1	0.015	0.041	0.841	0.000
group * ICATX	1	0.008	0.04	0.843	0.000
group * ICASX	1	2.36	15.454	0.000	0.146
group * BPSX	1	274.12	2.602	0.110	0.028
group * BPDX	1	189.253	3.138	0.080	0.033
group * HBX	1	1.253	5.549	0.021	0.057

As is clear from the above table, the two groups were different from each other on parameters like Worry and Negative emotion (State), Attention Deficit (State), Autonomic Arousal and Anxiety (State), Striated Muscle Tension (State) and Interpersonal Conflict and Anger (State) before treatment. They were equivalent on all the other parameters before treatment.

Univariate Analysis of Covariance was calculated to test the effectiveness of the intervention.

Table 2. Univariate Analysis of Covariance

ANCOVA							
	TypeIII S.S	Df	m.s.	f	Sig.	B (YN)	Eta
BNETY	0.639	1	0.639	3.304	**0.072**	-0.166	0.035
BNESY	7.481	1	7.481	36.351	0.000	-0.567	0.283
DPTY	1.859	1	1.859	8.832	0.004	-0.282	0.088
DPSY	8.176	1	8.176	39.306	0.000	-0.592	0.299
PANSATY	1.006	1	1.006	5.823	0.018	-0.207	0.060
PANSASY	5.54	1	5.54	33.573	0.000	-0.489	0.267
TPPMTY	4.192	1	4.092	12.885	0.001	-0.427	0.123
TPPMSY	5.448	1	5.448	14.023	0.000	-0.489	0.132
DTY	2.036	1	2.036	5.292	0.024	-0.295	0.054
DSY	5.014	1	5.014	13.403	0.000	-0.467	0.127
IKBTY	0.036	1	0.036	0.181	**0.671**	-0.039	0.002
IKBSY	4.027	1	4.027	22.904	0.000	-0.415	0.199
BPSY	3863.834	1	3863.834	36.045	0.000	-12.92	0.282
BPDY	1314.199	1	1314.199	21.295	0.000	-7.562	0.188
HBY	1.093	1	1.093	4.611	0.034	0.245	0.048

Univariate analysis of Covariance shows that all the 12 subscales of the Stress Symptoms Inventory showed a decrease with the practice of Yoga Nidrā, as is evident from the column showing Beta for Yoga Nidrā. Significant reductions in self-reported stress were found on all the twelve subscales, except for Worry and negative emotion (trait) and Interpersonal conflict and anger (trait) subscale. But since WNES, ADS, AAAS and SMTS were the subscales on which the two groups were initially unequal, it is difficult to estimate the actual effect of treatment. The effect size was small to moderate for all the parameters.

Blood pressure, both systolic ($F (1,92) = 36.04$, $p < .01$) as well as diastolic ($F (1,92) = 21.29$, $p < .01$) showed a significant reduction after treatment. The effect size was .282 and .188 respectively. Hemoglobin showed a rise in the experimental group ($F (1,92) = 4.61$, $p < .05$).

Glucose scores were analyzed in a different way because glucose is a curvilinear variable. Yoga and relaxation have been used as therapeutic measures in the treatment of diabetes. So also, low blood sugar has been shown to be associated with irritability, fatigue, attentional deficit and other symptoms. Since Yoga Nidrā is a process which acts to normalize various functions of the body, it was expected that it would have a normalizing effect on the functioning of the pancreas as well. Hence with Yoga Nidrā it was expected that the glucose scores on the lower side would increase while those on the higher side would decrease. In statistical terms, the variance in the glucose scores would reduce in the treatment group after the practice, whereas in the control group it would not. The results supported this hypothesis. The variance in the treatment group reduced while that of the control group increased.

Discussion

The sample chosen for the present study was women in the age group of 30 to 45 years. In a study by Thakar and Mishra (1999), about daily stresses experienced by working and non-working women of various age groups, it was found that employed women in the age group of 34 to 43 years reported experiencing maximum stress. It was concluded that coping with teen-age children, ailing in-laws, increased responsibilities of the husband as well as of oneself at the work place, all contributed towards making this phase the most stressful one, in the lives of these working women.

The present study was carried out for a considerably long period of time. A full-length course of the most prevalent form of relaxation training that is, Jacobsonian progressive relaxation training takes as many as 50 sessions. The more abbreviated form of progressive relaxation training takes about 8 to 10 sessions. In a meta-analysis of relaxation studies, Hillenberg and Collins (1982), note that a majority of studies that fail to show any significant differences between relaxation training groups and no-treatment control groups, use an average of only 2.3 sessions. The studies that report significant differences use about twice those many sessions. They also noted that only 5.6 per cent studies about relaxation worldwide have used more than 10 sessions. In his book on Yoga Nidrā, Swami Satyananda Saraswati (1998) says that about one month of regular practice of Yoga Nidrā is needed to show any considerable change either in personality or for any physical problem. In the present study, the experimental group underwent 30 sessions of Yoga Nidrā over a period of one and a half month.

The results indicate that there was a reduction in stress both in scores of the Smith Stress Symptoms Inventory as well as in the physiological parameters of stress that were tested. Among the Stress Symptoms Inventory subscales that showed a significant decrease were *Attentional deficit* (Trait), *Autonomic Arousal and Anxiety* (Trait), *Striated Muscle Tension* (Trait), *Depression* (Trait), *Depression* (State), *Systolic Blood pressure* and *Diastolic Blood Pressure*. Interestingly, most of the trait scores showed a significant decrease, which means that the subjects learnt to relax and it became a habit. The effect that is achieved during the actual practice of Yoga Nidrā is carried well beyond the practice and gets generalised to other aspects of life as well.

All the other physiological parameters, namely, blood pressure, both systolic as well as diastolic, and heart rate showed equal variance across the two groups. Both Systolic and Diastolic Blood Pressure showed a significant reduction after treatment. This is consistent with other research findings (e.g. Candill, Friedman & Benson, (1987), Sanderlin, (1991)) and so on.

Heart rate showed an increase after treatment but it was not statistically significant. Moreover the effect size is also small. The partial eta squared was only .040, which means that this parameter could not explain more than 4 percent of the variance in the dependent variable.

Results indicated that the variance of the glucose scores in the treatment group decreased after treatment while that of the control group did not. This was in keeping with the hypothesis framed. This being a pilot study with a normal (non-diabetic) sample, the interpretation is tentative and further careful research is warranted. But if stress has been shown to be an important, if not causative, factor in the development of diabetes, this study opens a wide area for research, to find out whether the relaxation can reduce stress and, thereby, restore normal glucose metabolism.

The significant reduction in stress symptoms both self-reported as well as that indicated by the physiological parameters undoubtedly point to the promise that relaxation holds in reducing stress and restoring health. But the present study is not without its limitations. First of all since the sample was limited to female participants, the findings cannot be generalized to include the male population. Secondly, the control group was not given any other substitute task and so the effect of passage of time alone cannot be ruled out. Lastly, the study was not double blind and therefore some amount of therapist's presence affecting the experimental group cannot be ruled out.

No qualitative research and no follow-up was possible as the group dispersed soon after the treatment period. But more in-depth studies with a focus on individual needs are definitely warranted.

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