Original Research Article

A study of use of relaxation techniques in reducing stress levels by measuring heart rate variability at tertiary health care centre

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Abstract

Background: Yoga is an ancient science originated in India. It includes diverse practices, such as physical postures, regulated breathing, instructed relaxation and meditation **Aims and Objectives:** To Study of use of Relaxation Techniques in Reducing Stress Levels by Measuring Heart Rate Variability at tertiary health care centre. Methodology :This was a cross-sectional study carried out in the apparently normal individuals to study the effect of various relaxation techniques like Breath focus, Body scan, Guided imagery, Mindfulness meditation, Yoga, tai chi, and qigong, Repetitive prayer etc. on heart rate variability during the six month period i.e. January 2018 to June 2018 so during the study period there were 80 individuals who given written consent HRV analysis was derived by ECG machine. The parameters were compared in both group at baseline (by paired t-test) and after 12 weeks and in Group E and Group Y at the end of 12 weeks was by unpaired t-test calculated by SPSS 19 version software. **Result:** In our study we have seen that The average age in both the age group was 36± 3.23 and 37± 3.13 was not statistically significant ($p>0.05$). The ratio of male and female was comparable in both the groups 3:1 and 2.33:1 was comparable in both the groups ($p>0.05$)The baseline parameters in both the groups were comparable ($p>0.05$) but the HRV after 12 weeks therapy High Frequency HRV increased in Group A as compared to Group B was significant ($P<0.05$); The Low frequency waves increased in Group B as compared to Group A ($p<0.05$) decreased Low frequency HRV and LF/HF ration after 12 weeks intervention was statistically significant ($P<0.05$) **Conclusion:** It can be concluded from our study that after 12 weeks training with various relaxations techniques the autonomic function measured by HRV i.e. High frequency Increased and low frequency decreased hence the parasympathetic dominance increased with the relaxations techniques.
Key Word: Relaxation Techniques, Heart Rate Variability (HRV), Autonomic function of heart

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Received Date: 24/02/2019 Revised Date: 11/04/2019 Accepted Date: 02/06/2019
DOI: https://doi.org/10.26611/1031031

Access this article online	
Quick Response Code:	Website: www.medpulse.in
	Accessed Date: 07 June 2019

INTRODUCTION

Yoga is an ancient science originated in India. It includes diverse practices, such as physical postures, regulated breathing, instructed relaxation and meditation[1]. Among the yoga based relaxation techniques, Deep relaxation technique (DRT), Cyclic meditation (CM), Shavasan are most popular. Practicing relaxation has earned popularity in Bangladesh. Recently, relaxation has come in limelight because of its cardiac and multisystem benefits among the practitioners.[2,3,4,5] Relaxation is practiced by means of simple meditation[2]. In addition, DRT has been described as meditation Process.[6] This type of relaxation technique induces a quiet state of mind European Society of Cardiology reported that relaxation technique had been used in cardiac rehabilitation since 1970.[7] A study reported recovery of seriously ill cardiac patients through relaxation and dietary modification.[3] Several researchers investigated the effect of relaxation response on cardiac autonomic nerve function by assessing heart rate

How to cite this article: Aditi Das, Rupali Thakur. A study of use of relaxation techniques in reducing stress levels by measuring heart rate variability at tertiary health care centre. *MedPulse International Journal of Physiology*. June 2019; 10(3): 36-39.
https://www.medpulse.in/Physiology/

variability (HRV) as it can quantify cardiac parasympathetic and sympathetic activity. It measures the variations of instantaneous heart rate as well as the R-R intervals[8] So we have investigated the HRV the individuals with various relaxation techniques in reducing stress levels by measuring heart rate variability at tertiary health care centre.

METHODOLOGY

This was a cross-sectional study carried out in the apparently normal individuals to study the effect of various relaxation techniques like Breath focus**,** Body scan, Guided imagery, Mindfulness meditation, Yoga, tai chi, and qigong, Repetitive prayer etc. on heart rate variability during the six month period i.e. January 2018 to June 2018 so during the study period there were 80 individuals who given written consent to be part of the study so these participants randomly divided to two groups Group A (n=40,Receiving relaxation techniques) and Group B (n=40,Control). All necessary details like age, sex. HRV analysis was derived by ECG machine. The parameters were compared in both group at baseline (by paired t-test) and after 12 weeks and in Group E and Group Y at the end of 12 weeks was by unpaired t-test calculated by SPSS 19 version software.

RESULT

Table 1: Distribution of the patients as per age and sex

	Group Y (n=40)	Group E (n=35)	p-value
Average age (Mean ± SD)	37± 3.98	35± 4.23	**p>0.05**
Sex			
Male	30	28	**p>0.05**
Female	10	12	

The average age in both the age group was 36± 3.23 and 37± 3.13 was not statistically significant (p>0.05). The ratio of male and female was comparable in both the groups 3:1 and 2.33:1 was comparable in both the groups (p>0.05)

Table 2: Distribution of the study subjects as per the HRV

	Group A (n=35)		Group B (n=35)		p-value Group Y and E (After 12 Wks)
	Basal	After 12 wks	Basal	After 12 wks	
HF (nu)	50.18 ± 16.14	56± 4.92*	54.58± 8.63	41.38 ± 20.89 *	P<0.05
LF (nu)	42.98 ± 9.87	35.68± 8.82 *	38.75 ± 5.45	54.12 ± 15.87*	P<0.005
LF/HF	1.20 ± 0.62	0.32 ± 0.18*	1.09± 0.43	3.49 ± 1.78 *	P<0.01
SDNN (ms)	39.76±5.89	49± 13.72 *	57.21 ± 11.64	36± 3.78*	p>0.05

The baseline parameters in both the groups were comparable (p>0.05) but the HRV after 12 weeks therapy High Frequency HRV increased in Group A as compared to Group B was significant (P<0.05); The Low frequency waves increased in Group B as compared to Group A (p<0.05) decreased Low frequency HRV and LF/HF ration after 12 weeks intervention was statistically significant (P<0.05)

DISCUSSION

Hans Selye defined stress as “a response to change in order to maintain the state of stability or homology that the body has maintained against the stimulus to break the mental and physical balance and stability of the body.” [9]Stress was also defined by Kenneth Hambly as a maladaptive state in which the sympathetic nervous system is overactivated, causing acute or chronic physical, psychological, and behavioral impairment[10]. The search for stress biomarkers remains a challenging task for researchers and clinicians as there are several obstacles. One obstacle is a lack of consensus on the definition of stress. Moreover, we lack a comprehensive framework for investigating how organisms function in and adapt to constantly changing environments[11]. At present, there is no universally recognized standard for stress evaluation. A number of studies using existing stress measurement methods (e.g., psychological measures of stress) and examining biological markers (e.g., cortisol, amylase) have been performed. Moreover, studies on heart rate variability (HRV) and stress are increasing in frequency. HRV is the fluctuation of the length of heart beat intervals[12]. HRV represents the ability of the heart to respond to a variety of physiological and environmental stimuli[13]. Low HRV conveys a monotonously regular heart rate. Moreover, low HRV is associated with impaired regulatory and homeostatic autonomic nervous system (ANS) functions, which reduce the body’s ability to cope with internal and external stressors. Thus, HRV is a noninvasive electrocardiographic method that can be used to measure the ANS in a variety of clinical situations (e.g., during

psychological stress evaluations)[14]. In view of observations of stress-associated variation in HRV and existing neurobiological evidence, HRV may be used as an objective assessment of stress and mental health. However, since psychiatric illnesses have numerous causes and symptoms, consistent biological measurements are difficult to acquire in individuals with mental illness. Thus, a patient's psychological and medical history should be equally considered when interpreting HRV results. Therefore, HRV can be considered a tool that reflects heart activity and overall autonomic health, rather than specific mental illnesses or disease states. Since the concept of stress includes biological and psychological factors, objective and physiological evaluations as well as self-reporting should be integrated when evaluating stress, using HRV in clinical practice. Many studies have found an association between mental health and HRV. However, since HRV is associated with various stress factors, stress duration, individual coping ability, and lifestyle habits, these studies are difficult to interpret. Many physical conditions and lifestyle habits can affect HRV results, including physiological factors (e.g., breathing, circadian rhythms, and posture), non-modifiable factors (e.g., age, sex, and genetic factors), modifiable lifestyle factors (e.g., obesity, metabolic syndrome, physical activity, smoking, and drinking), and other factors [e.g., medication (e.g., anticholinergics, stimulants, and beta-blockers)][14-15]. Hans Seyle[9,16] proposed a three-stage stress response model. The first stage is the "alarm reaction stage," in which the body reacts to a stressor with the fight-or-flight response and activates the SNS. The second stage is the "resistance stage," in which the body adapts to the stressor. During this stage, the PNS restores many physiological functions to normal, while the body focuses its resources against the stressor. Although the outward appearance of the organism seems normal, blood glucose, cortisol, and adrenalin levels remain elevated. If a stressor continues beyond the body's capacity to cope, the organism exhausts its resources, making it susceptible to disease or death. This "exhaustion stage" is reached when the acquired adaptation or resistance is lost. When assessing the severity of a patient's stress level in a clinical setting, HRV results should be interpreted with this three-stage process in mind. At each stage, stress causes changes in physiological function, which are reflected in HRV changes. Due to the variety of potential stressors and individual stress responses, it is essential to understand the overall autonomic context and examine a patient's medical and psychological history when interpreting the relationship between HRV and stress. In our study we have seen that The average age in both the age group was 36± 3.23 and 37± 3.13 was not statistically significant ($p>0.05$). The ratio of male and female was comparable in both the groups 3:1 and 2.33:1 was comparable in both the groups ($p>0.05$) The baseline parameters in both the groups were comparable ($p>0.05$) but the HRV after 12 weeks therapy High Frequency HRV increased in Group A as compared to Group B was significant ($P<0.05$); The Low frequency waves increased in Group B as compared to Group A ($p<0.05$) decreased Low frequency HRV and LF/HF ration after 12 weeks intervention was statistically significant ($P<0.05$) These findings are similar to Monzur-E- Fatema[17] they found cardiac autonomic function improved ($p<0.05$) by practice of Relaxations techniques

CONCLUSION

It can be concluded from our study that after 12 weeks training with various relaxations techniques the autonomic function measured by HRV i.e. High frequency Increased and low frequency decreased hence the parasympathetic dominance increased with the relaxations techniques.

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Source of Support: None Declared
Conflict of Interest: None Declared