Effectiveness of relaxation therapy on physiological variables among elderly residing in homes for the aged

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Abstract
Background: Aging is an inevitable developmental phenomenon. As a person ages, possibility of problems multiplies. A variety of physiological changes may occur and they become more vulnerable to illnesses. The body's natural relaxation response is a powerful antidote to stress. Relaxation techniques such as deep breathing, visualization, progressive muscle relaxation, music, physical exercise, meditation and yoga can help to activate the relaxation response. Objectives: To assess the effect of relaxation therapy on physiological variables among elderly in selected homes for the aged. Materials and Methods: True experimental pre-test, post-test design. 120 elderly clients from 12 old age homes were selected by stratified proportionate random sampling technique (Control: 60; Experimental:60). Pre test was done with Demographic data sheet, Physiological problem assessment questionnaire (PPAQ) for Control and Experimental group. Control group had their normal routines, whereas exp group had Jacobson's progressive muscle relaxation technique (JPMR), music, physical exercise and laughter therapy.Posttest was done on 30th day and 120th Data analysis and interpretation was done by descriptive and inferential statistics. Results: The study showed the effectiveness of relaxation therapy on physiological problems among elderly people in control and experimental groups at < 0.001 level of significance.

I.   Introduction

The extent of health problems is relatively high among the elderly in homes for the aged. These health problems are caused mainly by long-term stress, either directly or as a psychological reaction to an illness. If stressful situations extend over a time, they can have an elevated risk for high blood pressure (Mayo Clinic, Arizona 2010), diabetes Mellitus, respiratory diseases (bronchial asthma and chronic obstructive pulmonary disease), ischaemic heart disease, osteoarthritis, gout and other chronic illnesses (Sherinal, et al, 2004).

WHO reported that 972 millon people in the world suffer from hypertension (2012) and raised blood pressure affects 1.13 billion people worldwide (2015). Hypertension occurs in more than two thirds of individuals after the age of 65. Increased blood pressure was a high risk factor that caused nearly 51% of deaths from strokes and 45% by coronary artery disease (Praveen, 2012). Researchers have identified multiple strategies that may help people to live a healthier and longer life: exercising and relaxation are most important among them. People who exercise are healthier than those who do not. Exercise improves the ability to do daily activities, maintains healthy weight and prevents or postpones disorders such as coronary artery disease and diabetes. Exercise that is more strenuous than walking may include any combination of four kinds: endurance, muscle strengthening, balance training, and flexibility (Richard and David, 2015).

Relaxation techniques reduce stress and hypertension. Among the various relaxation techniques, progressive muscle relaxation (PMR) is considered the simplest and most effective method to decrease muscle tension, reduce the level of stress and lower blood pressure (Praveen, 2012) Jacobson progressive muscle relaxation is widely used in reducing mental tension and is an intervention that has been used extensively to reduce high levels of stress and positively promote better health (Shenbagavalli and Divya 2010).

A quasi-experimental study was conducted to evaluate the effectiveness of progressive muscle relaxation on blood pressure and psychological status among 40 hypertensive subjects in Taiwan. The result revealed that progressive muscle relaxation training has an immediate effect, reducing the pulse rate 2.35bpm, systolic BP 5.44 mmHg and diastolic BP 3.48 mmHg after two weeks of training. After 4 weeks of progressive

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muscle relaxation further decrease in pulse rate 2.9 bpm, systolic BP 5.1 mmHg and diastolic BP 3.1 mmHg occurred. The study concluded that progressive muscle relaxation significantly lowered patients' perception on stress and it enhanced patients' perception on health; it was also found that progressive muscle relaxation is beneficial for patients with essential hypertension (Sheila, et al 2003).

The complementary aim of the present study was to (i) assess the bio- physiological variables such as systolic blood pressure, diastolic blood pressure, bodyweight, respiratory rate, and pulse rate among elderly in homes for the aged, (2) assess the effect of relaxation therapy on bio- physiological variables, (3) assess the bio-chemical variables such as fasting blood sugar (FBS), total cholesterol (TC), triacylglycerol (TAG), high density lipoprotein(HDL), low density lipoprotein (LDL), and very low density lipoprotein (VLDL), and (4) assess the effect of relaxation therapy on bio- chemical variables.

II. Materials And Methods

Participants: Randomly selected elderly totalling one hundred and twenty (60 each in control and experimental groups) were the participants. People in the 60-80 age group residing in old age homes were chosen for the study. Details of selection of elderly in the control and experimental groups are outlined in chapter 4.Selection was done after obtaining permission from the authorities of the old age homes and informed consent from those participating in the study. The study was done on the approval of the institutional Human Ethics Committee of Saveetha Medical College and Hospital, Chennai.

Methodology: In the old age homes, after a Mini Mental Status Examination (MMSE), physician fitness check ups were administered, an equal number from both genders and age groups of 61-70 and 71-80 were taken for the study. At 5.30 am, on the first day of pre-test, the investigator reached the old age home and collected fasting blood samples for FBS and lipid profile (TC,TG, LDL and VLDL). The vital monitoring chart was prepared by checking BP,PR,RR,BW, and a physiological problems assessment questionnaire (PPAQ) was distributed and filled out. The experimental group was given relaxation therapy for four months: in the morning one hour JPMR with background music and in the evening for one hour of physical exercise and laughter therapy. On day 30, post-test one was conducted and on day 120 post-test two was conducted.

Statistics: Both parametric and non-parametric tests were used to analyze data. Since the data was not widely distributed, ranked and discrete, the median was used for the statistical analysis of the physiological problem assessment questionnaire. Friedman repeated measures ANOVA on ranks with Student- Newman –Keuls method was used to identify the significant difference between pre-test and post-tests one and two of both control and experimental groups. The comparison between control and experimental groups was done by Mann Whitney Rank Sum test. The BP,PR,RR and BW were analyzed by parametric tests such as mean ± SE, the one-way RM ANOVA Rank Sum test and unpaired 't' test since the data is continuous, widely distributed and not ranked. The data were analyzed using Sigma Plot13.0 (Systat Software Inc., USA).

III. Results

Table - 1: Description of elderly, according to their demographic characteristics

S. No.	Categories	Control group		Experimental Group		x^2, Value, df, P- Value
		n (60)	%	n (60)	%	
1	Age					
	60-70	30	50	30	50	0, df = 1
	71-80	30	50	30	50	P= 1.000
2	Gender					
	Male	30	50	30	50	0, df = 1
	Female	30	50	30	50	P= 1.00
3	Religion					
	Hindu	21	35	12	20	3.41
	Christian	38	63	47	78	df = 2,
	Muslim	-	-	-	-	P= 0.182
	Any other	1	2	1	2	
4	Education					
	Illiterate	9	15	8	13	1.53
	Primary	30	50	28	47	df = 4 P=.821
	High School	13	22	12	20	
	Higher Secondary	6	10	7	12	
	Graduate	2	3	5	8	
5	Marital Status					
	Single	6	10	29	48	32.6,
	Married	29	48	28	47	df = 3
	Divorced	11	18	2	3	P= 0.0001
	Widow/ widower	14	24	1	2	
6	Work status					
	Employed	3	5	3	5	0, df = 1
	unemployed	57	95	57	95	P = 1.000
7	Type of family					
	Nuclear	38	63	39	65	0.036,
	Joint	22	37	21	35	df = 1
						P = 0.846
8	Medical Problems					
	Yes	40	67	44	73	0.635
	No	20	33	16	27	df = 1,
						P= 0.426

S. No	Categories	Control group		Experimental Group		x^2, Value, df, P- Value
		n (60)	%	n (60)	%	
9	Length of stay					6.65
	Less than one year	5	8	10	17	df = 4
						P = 0.156
	2-5 years	36	60	36	60	
	6-10 years	15	25	6	10	
	11-15 years	3	5	2	3	
	16-20 years	1	2	3	5	
	More than 20 years	-	-	-	-	
10	History of DM					0.15
	Yes	39	65	41	68	df = 1
	No	21	35	19	32	P = 0.699
11	History of HTN					0.833
	Yes	50	83	46	77	df = 1
	No	10	17	14	23	P = 0.361
12	Duration of Medication					0.288
	Below one year	32	53	33	55	df = 3
						P = 0.962
	2-5 years	12	20	10	17	
	5-10 years	11	18	11	18	
	11 and above	5	9	6	10	
13	Psychiatric illness					0.484
	Yes	10	17	13	22	df = 1
	No	50	83	47	78	P = 0.487

14	History of Practice in any relaxation Technique				2
	Yes	14	23	8	13	df = 1
	No	46	77	52	87	P = 0.157

Table 2: Physiological problems of elderly people with relaxation therapy in control and experimental group in pre-test and post-test

Parameters	Group	Mean ± S E	Median (25th-75th percentile)	Con - pre Exp– pre	Con - P o1 Exp - Po1	Con - Po2 Exp - Po2
Physiological problems	Con- pre	43.7±.58	44(39-48)	t=3844 p=0.263	t=5134 p=<0.001	t=5381 p=<0.001
	Con- po 1	43.5±.55	43(39-47)			
	Con- po 2	43.5±.55	43(39-47)			
	Exp- pre	42.8±.49	43(39-47)			
	Exp- po 1	32.1±.59	32(29-36)			
	Exp- po 2	26.08±.47	26(22-30)			

Table 3: Physiological variables of elderly people with relaxation therapy in control and experimental group in pre-test and post-test

S No	Parameters	Group	Mean ±SE	Con – pre Exp– pre	Con - Po1 Exp Po1	ConPo2 ExpPo2
1	SBP	Con- pre	127.81±1.9	t=0.757 p=0.450	t=0.991 p=0.324	t=0.444 p=0.658
		Con- po 1	120.8 ±.11			
		Con- po 2	117.8±.88			
		Exp- pre	130.5± .19			
		Exp- po 1	118.5±.13			
		Exp- po 2	116.2±.11			
2	DBP	Con- pre	78.8±.73	t=0.191 p=0.849	t=0.109 p=0.913	t=1.198 p=0.233
		Con- po 1	78.2±.81			
		Con- po 2	76.2±.73			
		Exp- pre	78.5±.11			
		Exp- po 1	78.0±.85			
		Exp- po 2	74.3±.92			
3	PR	Con- pre	86.4±.50	t=4.478 p=0.263	t=8.759 p=<0.001	t=13.476 p=<0.001
		Con- po 1	86.4±.50			
		Con- po 2	86.4±.50			
		Exp- pre	80.9 ±.79			
		Exp- po 1	77.6±.58			
		Exp- po 2	74.9±.42			
4	RR	Con- pre	20.6±.25	t=0.769 p=0.449	t=3.112 p=<0.001	t=6.402 p=<0.001
		Con- po 1	86.4±.50			
		Con- po 2	86.4±.50			
		Exp- pre	80.9±.79			
		Exp- po 1	77.6±.58			
		Exp- po 2	74.9±.42			
5	BW	Con- pre	65.7±.73	t=1.590 p=0.114	t=2.870 p=<0.005	t=4.567 p=<0.005
		Con- po 1	65.6±.72			
		Con- po 2	65.9±.74			
		Exp- pre	63.7±.61			
		Exp- po 1	62.0±.65			
		Exp- po 2	59.6±.75			

IV. Discussion

The above studies examined the effectiveness of relaxation therapy on bio-physiological parameters, systolic blood pressure, diastolic blood pressure, pulse rate, respiratory rate, and body weight among elderly in homes for the aged. The bio-chemical parameters were fasting blood sugar and lipid profile (TC,TG, HDL, LDL and VLDL). The result of the study showed a significant difference between pre-test and post-test in the experimental group in all of the bio-physiological and biochemical parameters, which demonstrated the effectiveness of relaxation therapy among the elderly in these homes.

The following studies support the findings of the present study indicating that various complementary and alternative therapies have a constructive effect on the wellbeing of the elderly. Life skill training programs with emphasis on breathing assisted medication interventions during three month periods improved hemodynamic functioning and caused a significant decrease in systolic blood pressure, diastolic blood pressure and heart rate (Mathew, 2010). The study also revealed a significant decrease in systolic blood pressure from 130.5 mmHg in the pre-test to 116.17 mmHg in the post-test, in diastolic blood pressure from 78.5 mmHg to 74.33 mmHg respectively in the experimental group after intervention (p < 0.001). A study undertaken to evaluate the effect of music on non-institutionalized elderly in terms of body temperature, pulse and respiration found that there is significant reduction in the pulse and respiration rate t= 21.24, p < 001 and t= 20.09, p< 001

respectively (Hari Krishna et al. (2014). Similarly, in present study, significant difference was observed in the pulse and respiratory rate between the pre-test and post-tests 1 and 2 in the experimental group (p < 0.001).

A meta-analytical study has shown that relaxing music affects blood pressure and heart rate in coronary heart disease and cancer patients. The study was done on 100 participants in experimental and control groups. Relaxing music provides great benefits to both patient and clinician. There is close relationship between relaxing music and health procedure, and it could be used as a non-invasive, safe, and inexpensive method with no side effects (Tan et al, 2015). A case-control interventional study on 67 medical students in two groups using short term relaxation therapy (*shavasana* with soothing background music) daily 1 hour for 6 weeks showed significant reduction in heart rate (p = .0001), systolic (p =.0010) and diastolic (p = .0021) pressure. As determined by the regression model, prediction of LF-HF to BP status was more significant (odds ratio, 2.7; p=0.009) after practice of relaxation therapy. There was no significant alteration in these parameters in control subjects (Pal et al, 2014).

Another study to assess the effectiveness of nursing interventions and relaxation technique on sleep among senior citizens residing in old age homes of Puduchery revealed that the mean post-test sleep pattern score of subjects is higher (P < 0.001) than that in the pre-test sleep pattern score (Vinod Shah 2012). A study conducted on the efficacy of two relaxation techniques on reducing pulse rate among highly stressed females documented that progressive muscle relaxation therapy is highly effective in normalizing pulse rate (Khanna et al, 2009). Weight is another important bio- physiological parameter used to monitor the health of elderly. It is often expressed in terms of body mass index (BMI). BMI is a measure of weight adjusted for height. It is a measure of adiposity as well used to predict overweight and obesity related co-morbidities in adulthood (Must and Anderson 2006). Similarly, in the present study, after the use of relaxation therapy a significant decrease in the body weight was observed in the experimental group. In addition, significant change in body weight was noticed in the control group also. Considering the changes in both the groups, and also as the interventions provided were mainly related to the physiological aspect, it may be presumed that the effectiveness of relaxation therapy had contributed to the changes in weight in experimental group.

An overwhelming amount of research by various world organizations, private government and non-governmental studies shows us that the rate of growth rate among an increasingly ageing population will increase in the twenty-first century. It is ironic that at a time in history when researches and discoveries in medical science, mental health and pharmacology have discovered a multitude of cures and medications to extend human life, the unexpected consequences inherent in these discoveries have lengthened the lifespan. Our challenge now is to care for those near the end of life's continuum as compassionately and cost-savingly as possible. The current has researched and tested a variety of ameliorative experiments that point to positive effects in caring for our aged, i.e., progressive muscle relaxation therapy and exercise tools that provide safe, non-pharmacological, non-invasive, painless and cost-effective methods to relieve physiological problems among the elderly. The studies and research data provided here suggest that these methods can easily be integrated into the growing field of geriatric and mental health nursing.

V. Conclusion:

With supportive evidence from the above-cited studies and the results obtained from the present study, the researcher concludes that a positive effect can be produced by relaxation therapy interventions on physiological variables among the elderly.

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