International Journal of Health Sciences and Research
www.ijhsr.org ISSN: 2249-9571

Original Research Article

An Intervention Study to Assess the Impact of Yoga Therapy on Level of Stress among Hypertensive clients at Urban centre of SGRD Hospital, Amritsar

Dr. Amandeep Kaur Bajwa

Professor and HOD of Psychiatry;
Sri Guru Ram Das College of Nursing, Vallah, Amritsar (Punjab)

ABSTRACT

Hypertension is the most common cardiovascular disease affecting more than one billion people worldwide. Yogic exercises (Asana, Pranayama and Meditation) have beneficial effects on hypertension, stress and quality of life. The present study was carried out with aim to assess the impact of yoga therapy on stress among hypertensive clients at SGRD Urban Health Centre Amritsar. Quasi experimental design was selected. Purposive and Convenience sampling techniques were used and study was conducted on 200 hypertensive patients aged 20-75 years, who were on antihypertensive drugs. They were randomized into two groups: control group (n=100) and experiment group (n=100). The experiment Group practiced yoga for I hr, 6 day/week for 3 month. The control group did not practice any type of yogic exercises. The data was collected through 'socio-demographic profile sheet standardized stress perceived scale after checking its validity and reliability through survey approach. Stufflebeam "CIPP Evaluation Model" was used for the conceptual framework.

It was found from the findings that there is a statistically highly significant difference According to stress level in experimental group there was a statistically highly significant difference between pre and post stress scores ('t' =68.8.p<0.000) where as in control group statistically there is no difference between pre and post stress scores ('t'=1.91, p=.059). There is a post test significant association of stress level with educational status (p=0.001). It was observed that a significant reduction in the systolic blood pressure, diastolic blood pressure and pulse rate occurs in subjects practicing yoga. So From the present study it is concluded that yoga therapy had positive impact on lowering blood pressure, reduce stress level.

Key Words: Hypertension, Stress, Yoga Therapy

INTRODUCTION

The relationship between stress and hypertension has been well documented. It indicates that blood pressure increases when a person is under emotional stress and tension. Sensory deprivation, social isolation, noise, crowding, high temperatures and air pollution that have been suggested as factors associated with stress. [1]

The word stress has its origin in Latin words "strictus" meaning tight or narrow. The root word reflects the internal feelings of tightness and contraction of the muscles and breathing. Stress is a common condition, a response to a physical threat or psychological distress that generates a host of chemical and hormonal reactions in the body. In essence, the body prepares to fight or flee, pumping more blood to the heart and muscles and shutting down all

nonessential functions. As a temporary state, this reaction serves the body well to defend itself. When the stress reaction is prolonged, however, the normal physical functions that have in response either been exaggerated or shut down become dysfunctional. [2]

Stress and health are closely linked. It is well known that stress, either quick or constant can induce risky body mind disorders. Frequent stress responses of our body increase a host of molecules potentially dangerous for the optimal health of the heart. These are low density lipoprotein (LDL) the Bad form of cholesterol and other lipid types such as 'triglycerides'. Because stress delays the processing and clearance of these fats, their accumulation puts people at risk of developing atherosclerosis or arteriosclerosis and other heart diseases. [3]

Stress influences the whole mechanism of our body. Stress damages our immune system and also damages the mind-body relations. Present life style is very hectic, very taxing and stressful. It looks differently for each person and can play a detrimental role in both physical and psychological health problems without proper coping skills. People under high pressure were apt to be nervous and anxious (psychological aspect), prone to headaches, high blood pressure and heart attacks (physical aspect) and prone to absenteeism, high rates of quitting jobs and low productivity (behavioral aspect)" It is vital to determine stress relievers in a world where stress dwells at every corner one turns. [4]

Today the emphasis is on the utilization of non pharmacological measures for treatment of diseases and returning to the normal healthy state based on these complementary alternative therapies which are natural, has no side effect and also lifelong gives positive results. [5]

In order to manage hypertension, lifestyle management, one of which is Yoga Lifestyle, helps treat and prevent hypertension through mind and body activities. Yoga, an ancient but perfect science, deals with the evolution of humanity. This evolution includes all aspects of one's being, from bodily health to self-realization. It has the capability on both preventive and curative levels. Yoga, the famous term, has been derived from the Sanskrit word 'yoga' which means "union". This special mode of treatment is significant in terms of establishing a duct between the individual soul (*jivatma*) and the universal soul (*parmatma*). [6]

Yoga is the science of life and the art of living. It is the common sense answer to overall physical and mental fitness. Basically Yoga is a system of physical and mental self improvement and final liberation that people have been using for thousands of years. Yoga cultivates the ways of maintaining a balanced attitude in day-to-day life and endows skill in the performance of one's actions. As for healthy life, balanced food regimen, good habits and a stress-free life is important; likewise yoga also contributes to healthy living. [7]

Need for Study

The fast pace of changing life styles makes adjustment difficult for mankind. The blood, the blood vessels and the heart together form the cardiovascular system. These blood vessels are having certain caliber; however they may constrict for a long period of time, thus causing the blood to flow through them under increased tension giving rise to an entity called 'Hypertension' - one of the major manifestations of mental stress. [8]

Cardiovascular disease is the leading cause of death in the world. Hypertension is usually regarded as a "sleeping snake "which bites when it wakes up. The disease as long as it sleeping will not bother the individual, but when it wakes up, it bites with all strength leaving the person with serious disabilities, death and catastrophic end results. [9]

In the modern world each and every individual's life has become stressful. This stressful life is directly affecting a common person. A common man is suffering from

various psycho physiological disorders. In this busy life schedule man is not having the time to relax. As the world is moving towards the 21st century cardiovascular diseases have became one of the leading cause of morbidity & mortality in developed countries. It is estimated that about 10 million deaths occurs due to cardiovascular diseases over the world .In India about 30,000 deaths have been reported each year due to hypertension. [10]

Cardiovascular Disease - Prevention and control, WHO, reports state that there are estimated 600 million people affected worldwide with hypertension. It causes 5 million premature death each year worldwide and 13% of global fatalities. The prevalence of hypertension in USA is 50 million and the prevalence rate is 1 in 5 or 18.38%. The undiagnosed prevalence rate of hypertension in USA is 1 in 8 or 5.51% or 15 million. [11]

Stress adversely affects a wide range of health conditions and yoga is arguably the most comprehensive approach in fighting stress ever invented. Research shows that yoga interventions: postures, meditation, relaxation, breathing practices, and a yogic diet can benefit a wide range of emotional and physical illness. Appropriate relaxation technique includes progressive muscle relaxation, visualization and breathing exercises and yoga. [12]

Yoga therapy can contribute in reducing blood pressure. Regular practice of yoga can reduce the blood pressure. It will prevent heart diseases and further complications. These therapies will be useful to community people for awareness of preventing heart diseases. Yoga therapy can be included in nursing care to hypertensive patients. It will improve the standard of nursing care. These alternative therapies will be included in nursing field. [13]

Statement of Problem

An intervention study to assess the impact of yoga therapy on level of stress among Hypertensive clients at urban centre of SGRD Hospital, Amritsar.

Objectives of study

1. To assess the level of stress among hypertensive clients.
2. To find out of impact of yoga interventional therapy on level of stress among hypertensive clients.
3. To find out the association between level of stress of hypertensive clients with selected demographic variables and with and without yoga intervention therapy.

Operational Definitions

Yoga therapy

Yoga therapy refers to a set of yoga practices consisting of Pranayama, Asana and Dhayana that would be carried on the clients on a scheduled time and as per developed protocol.

Stress

It refers to an event that triggers the adaptive physiological and psychological responses in hypertensive clients and will be measured by using standardized stress scale.

Hypothesis

$H_{1:}$ There is a significant difference between pretest and posttest scores of stress of hypertensive clients in experimental and control group at $p \leq 0.05$ level.

H_{01}: There is no significant difference between pretest and posttest scores of stress of hypertensive clients in experimental and control group at $p \leq 0.05$ level.

REVIEW OF LITERATURE

The purpose of this study conducted by Sharma M (2014) to look at studies from 2011 to May 2013 and examine whether yoga can be an efficacious approach for managing stress. A systematic search of Medline, CINAHL, and Alt Health Watch databases was conducted for quantitative articles involving all schools of yoga. A total of 17 articles met the inclusion criteria. Six of these were from the United States, 3 from India, 2 from the United Kingdom, and 1 each from Australia, Brazil, Germany, Iraq, Sweden, and Taiwan. Of the 17 studies, 12 demonstrated positive changes in psychological or physiological outcomes related to stress. Despite the limitations, not

all studies used a randomized controlled design, had smaller sample sizes, had different outcomes, had non standardized yoga intervention, and had varying lengths; yoga appears to be a promising modality for stress management. [14]

The aim of the phenomenological descriptive study was conducted by Agneta Anderze et al (2014) to explore the meaning of participating in medical yoga as a complementary treatment for stress-related symptoms and diagnosis in a primary health care setting. Five women and one man (43_51 years) participated. They were recruited from the intervention group (n_18) in a randomized control trial, in which they had participated in a medical yoga group in addition to standard care for 12 weeks. Data were collected by means of qualitative interviews, and a phenomenological data analysis was conducted. The essential meaning of the medical yoga experience was that the medical yoga was not an endpoint of recovery but the start of a process towards an increased sense of wholeness. It was described as a way of alleviating suffering, and it provided the participants with a tool for dealing with their stress and current situation on a practical level. It leads to greater self awareness and self-esteem, which in turn had an implicit impact on their life world. In phenomenological terms, this can be summarized as another way of being in the world, encompassing a perception of deepened identity. From a philosophical perspective, due to using the body in a new way (yoga), the participants had learnt to see things differently, which enriched and recast their perception of themselves and their lives. [15]

MATERIALS AND METHODS

Research Design: A quasi experimental study design, was adopted for this study Pretest-Posttest control group design is adopted for the study.

Experimental group R (Pretest) ⟶ X (Yoga intervention) ⟶ O_1 (Post test)
Control group R (Pretest) ⟶ (No intervention) ⟶ O_1 (Post test)

Research Variables:
Independent variable of the study is a set of six systemic yoga therapy.
Dependent variable in the study include blood pressure level, stress level, and quality of life of hypertensive clients

Setting of the study:
The physical location and condition in the data collection that takes place in a study is known as setting.
The present study was conducted on population of urban health center, of S.G.R.D charitable hospital, Amritsar. Urban health center covers total 150,000 populations. The area is divided into 5 parts as Guru Nanakpura, Kot Ralia Ram, Guru Ramdas Nagar, Kitte no. 1 to 7, and Bahadur Nagar. Facilities in the urban health center immunization, treatment of minor ailments, surveillance of hypertensive patients and other disease in community through lab services, MCH and RCH services, health education and family planning services.

The primary reasons for selecting this urban health centre were investigator's convenience, Easy access to subject's, familiarity, feasibility and the expected cooperation from the authorities in getting permission for conducting the study.

Sample size:
Sample consists of a subset of a population selected to participate in research study. 200 hypertensive clients who attended the urban health centre at Sri Guru Ram Das Charitable hospital, Amritsar.

Sampling technique:
Sampling technique is the procedure the researcher adapts in selecting the sample for the study. The sampling technique used for this study was purposive and convenient.

Population:
In the present study, population consists all hypertensive clients of an urban health

centre at Sri Guru Ram Das Charitable hospital, Amritsar.

Criteria for sample collection

The criteria for defining the population and selecting the sample is based on cost, practical concern, people's ability to participate in the study and design consideration. The study involves

Inclusion Criteria

1. Clients who are willing and able to participate
2. Males & females of age range 20 - 75 years
3. Patients having essential hypertension
4. Patients having mild-moderate blood pressure (D.B.P.90-114mm of Hg) / with mean awake systolic or diastolic ABP ≥135 mm Hg or 85 mm Hg, or mean 24 h ABP ≥130 mm Hg or 80 mm Hg
5. All biochemistry, hematology and urine analysis test results without any clinically significant abnormalities.
6. Written informed consent

Exclusion Criteria

1. BP >180/100 mm Hg and ABPM ≥160/100 mm Hg
2. Uncontrolled Diabetes
3. Secondary hypertension
4. Renal disease (Glomerular filtration rate <60 ml/min or overt nephropathy)
5. History of angina, heart attack
6. History of stroke or transient ischemic attack
7. Re-vascularisation procedure
8. Active malignant disease (except non-melanoma skin cancer)
9. Epileptic seizure 6 months before the screening visit
10. Congestive heart failure
11. Severe liver disease.
12. Pregnancy or lactation period Pregnancy/lactating clients
13. Significant hematological abnormalities
14. COPD, AIDS, TB, Severe Anemia

Description of the final tool

***Section – A*: Sociodemographic profile.**

This part consisted of (16) items for obtaining personal information of the research samples about Age, Gender, Religion, Type of Family, Family monthly income, Dietary habit, Educational status, Marital status, Occupational status, Duration of hypertension, Social habits, Family history of hypertension, Co-morbid Diseases, Known Hypertensive, History of any hospitalization for hypertension and Treated with .

Section – B*: Perceived Stress Scale*

The Perceived Stress Scale is a 10-item self report questionnaire that measures persons' evaluation of the stressfulness of the situations in the past month of their lives. The citation for the 10-item scale is Cohen. S. & Williamson. G. (1988). Scores are obtained by reversing the scores on the four positive items, e.g., 0=4, 1=3, 2=2, etc. and then summing across all 10 items. Items 4, 5, 7, and 8 are the positively stated items. Scores can range from 0 to 40, with higher scores indicating greater stress. This scale was translated into Punjabi.

Score for positive questions

- Never 0
- Almost Never 1
- Sometimes 2
- Fairly Often 3
- Very Often 4

Score for negative questions

- Never 4
- Almost Never 3
- Sometimes 2
- Fairly Often 1
- Very Often 0

Scoring criteria

- 0 -10 Minimal level of stress
- 11 -20 Mild levels of stress
- 21 -30 Moderate levels of stress
- 31 -40 Severe levels of stress

Development of Yoga Therapy protocol

A protocol for Yoga intervention was developed. Yoga was demonstrated by trained therapists and by me to groups of 25 subjects and consists of a set of six systemic yoga therapy demonstrations. Intervention group 1 (100 persons) was divided into four smaller groups, each consisting of 25 participants. Each group met daily for one

month for 60 minutes at the health care center to practice yoga with a yoga instructor. The participants were encouraged to practice yoga for 30 minutes every day at home. They were also given a yoga calendar in which to record when they did yoga. The yoga classes comprised various yoga movements and positions, breathing techniques and meditation. The yoga was taught in a room, specially arranged for the purpose, with yoga mats, pillows, blankets and chairs.

Control Group

No changes were made for the participants in the control group (100 persons) (treatment as usual: treatment with the medication they were already taking and annual medical examination by the general practitioner).

RESULTS AND DISCUSSION

Table 1: Frequency and percentage distribution of subjects in experimental and control group.

Socio-demographic variables	Control Group (n=100)		Experimental Group (n=87)		χ^2 (df) p value
	f	% age	F	% age	
Age (in years)					
20-35	15	15.0	16	18.4	1.3, df=3 p>0.05
36-50	32	32.0	28	32.2	
51-65	27	27.0	26	29.9	
>65	26	26.0	17	19.5	
Gender					
Male	39	39.0	38	43.7	0.25, df=1 P>0.05
Female	61	61.0	49	56.3	
Education Status					
Primary	19	19.0	28	32.2	4.7, df=4 p>0.05
Middle	29	29.0	21	24.1	
10+2	25	25.0	15	17.2	
Graduate	25	25.0	21	24.1	
PG or above	2	2.0	2	2.3	
Marital Status					
Married	81	81.0	72	82.8	0.1, df=2 P>.05
Unmarried	10	10.0	8	9.2	
Widow/Widower	9	9.0	7	8.0	
Religion					
Hindu	20	20.0	18	20.7	0.88, df=2 p>0.05
Sikh	79	79.0	69	79.3	
Others	1	1.0	0	0.0	
Occupational Status					
Employed	32	32.0	28	32.2	0.05, df=3 p>0.05
Unemployed	58	58.0	50	57.5	
Business	4	4.0	4	4.6	
Labourer	6	6.0	5	5.7	
Type of Family					
Nuclear	44	44.0	45	51.7	2.57, df=2 P>0.05
Joint	54	54.0	38	43.7	
Extended	2	2.0	4	4.6	
Family monthly Income					
Rs ≤ 10,000	58	58.0	49	56.3	0.22 df=3 P>0.05
Rs 10,001-15,000	18	18.0	18	20.7	
Rs 15,001-20,000	17	17.0	14	16.1	
Rs ≥ 20,001	7	7.0	6	6.9	

p>0.05= Non significant (NS)

Table 1 depicts the selected socio-demographic profile of the study subjects of experimental and control group. According to age, data revealed that out of 100 subjects, majority of subjects i.e. 32(32.0%) in experimental group were in age group of 36-50 years and out of 87, 28 (32.2%) subjects in the control group were in age group of 36-50 years. The least number of subjects in both groups i.e. 15 (15%) in experiment group and 16 (18.4%) respectively were in the age range of 20-35 years (Figure 5.1). Both the groups were homogenous as per age wise distribution at 5% level of significance (χ^2=1.3, df =3, p>.05).

With regards to gender, majority of subjects in both groups i.e. 61 (61.0%) in the experimental group and 49 (56.3 %) in the control group were females (Figure 5.2). There is no significant difference between both the group as per gender (χ^2=0.25, df =1, p>.05)

With regards to education status, majority of subjects i.e. 29 (29%) in the experimental group were studied up to middle class; 25 (25%) had done 10+2 and same number of subjects did graduation and rest 19 (19%) studied up to primary schooling and 2(2%) did post graduation. Whereas in the control group majority of subjects i.e. 28 (32.2%) were studied up to primary school, 21 (24.1%) studied up to middle class, 15 (17.2%) up to 10+2, 21 (24.1%) up to graduation and rest 2 (2.3%) did post graduation (Figure 5.3). There was no significant difference between both group as per their education status (χ^2=4.7, df =4, p>.05).

Marital status wise, majority of subjects in both groups i.e. 81 (81%) in experiment group and 72 (82.2%) in control group were married and rest 10 (10%) and 8 (9.2%) were unmarried in respective groups; and 9 (9%) and 7 (8%) were widow/widowers in respective groups. (Figure 5.4). There was no significant difference between both group as per their marital status (χ^2=0.1, df = 2, p>.05).

Thus both groups are homogenous according to selected socioeconomic variables.

Religion wise, data revealed that majority of subjects in both groups i.e. 79 (79%) in experimental group and 69 (79.3%) in control group were Sikh; 20 (20%) in experiment group and 18 (20.3%) in control group were Hindus (Figure 5.5). There is no significant difference between both the group as per religion (X^2=0.88, df =2, p>.05)

As per occupational status, data revealed that majority of subjects in both groups i.e. 58 (58%) in the experimental group and 50 (57.5%) in control group were unemployed and rest 32 (32%) and 28 (32.2%) in experiment & control group respectively were employed; 6(6%) & 5 (5.7%) in experiment & control group respectively were labourer; and 4 (4%) & 4 (4.6%) in experiment & control group respectively were in business (Figure 5.6).There was no significant difference among both group as per their occupational status (X^2 value=0.05, df = 3, p>.05).

With regards to type of family, in experiment group majority of subjects i.e. 54 (54.0%) were from joint family; 44 (44%) from nuclear family; and rest 2 (2%) from extended family. In the control group, majority of subjects i.e. 45 (51.7%) were from nuclear family and rest 38 (43.7%) were from joint family and 4 (4.6%) subjects were from extended family (Figure 5.7). But statistically both groups were homogenous (X^2=2.57, df =2, p>.05).

According to monthly income, in both groups, majority of subjects i.e. 58 (58.0%) & 49 (56.3%) were having monthly income 10.000/- or less than 10,000; 18 (18.0%) & 18 (20.7%) in respectively were having Rs. 10,001/- to 15,000; 17 (17%) & 14 (16.1%) were having 15,000/- to 20,000; and rest 7 (7%) and 6 (6.9%) in experiment and control group respectively were having monthly income Rs more than 20,000/- (Figure 5.8). There was no significant difference between both the group as per their monthly income (X^2 value=0.22, df = 3, p>.05).

Thus both groups are homogenous according to selected socioeconomic variables.

Table 2 depicts selected life style and clinical profile variables of study subjects of experimental and control group.

As per dietary habits, data revealed that majority of subjects in both groups i.e. 50 (50%) in control group and 50 (57.5%) in experiment group were vegetarian and rest 50 (50%) in control group and 37 (42.5%) in experiment group were non vegetarian (Figure 5.9). There is no significant difference between groups as per their dietary habit (X^2=0.77, df =1, p>.05).

Table 2: Frequency and percentage distribution in experimental and control group according to their selected life style and clinical profile variables

Variables	Control Group (n=100)		Experimental Group (n=87)		χ^2
	f	% age	f	% age	
Dietary Habits					
Vegetarian	50	50.0	50	57.5	0.77, df=1, >.05
Non-vegetarian	50	50.0	37	42.5	
Risk behavior					
Not any	65	65.0	50	57.5	1.39, df=4, >.05
Smoker	5	5.0	7	8.0	
Alcoholics	25	25.0	25	28.7	
Both smoker and alcoholics	2	2.0	2	2.3	
Use of drugs	3	3.0	3	3.4	
Family History of hypertension					
With	53	53.0	48	55.2	0.02. df=1, p>.05
Without	47	47.0	39	44.8	
Previous history of hypertension					
≤ 1 year	24	24.0	28	32.2	3.18, df=3, p>.05
2 years	21	21.0	22	25.3	
3 years	24	24.0	18	20.7	
≥ 4 years	31	31.0	19	21.8	
Co-morbid diseases					
No co-morbid disease	54	54.0	47	54.0	9.88*, df=4, p<.05
Diabetes Mellitus	37	37.0	21	24.1	
Dyslipidemia	7	7.0	18	20.7	
Renal failure	1	1.0	0	0.0	
*Chronic obstructive pulmonary disease (*COPD)	1	1.0	1	1.1	
Known hypertensive					
Yes	91	91.0	70	80.5	3.48. df=1, p>.05
No	9	9.0	17	19.5	
Hospitalization					
Yes	16	16.0	15	17.2	0, df=1, p>.05
No	84	84.0	72	82.8	
Treatment modalities					
Drugs	66	66.0	55	63.2	0.16, df=2, p>.05
Diet	21	21.0	20	23.0	
Exercise	13	13.0	12	13.8	

p>0.05= Non significant (NS) *p<0.05= significant at 5% level

According to risk behaviour, majority of subjects in control group i.e. 65 (65%) had no risk behaviour followed by 25 (25%) who were in the habit of consuming alcohol, 5(5%) were smokers, 3 (3%) were alcoholics and smokers; and 3(3%) were taking drugs. Whereas in experiment group, out of 87 subjects, 50(57.5%) had no risk behaviour, 25(28.4%) were in the habit of consuming alcohol, 2(2.3%) were both alcoholics and smokers; and 3(3.4%) were taking drugs (Figure 4.10). There is no significant difference between groups as per their risk behaviour (X^2=1.39, df =4, p>.05)
As per family history of hypertension, more than half of subjects both in the control group (53%) and in the experiment group (55.2%) had history of hypertension in their family (Figure 4.11). There is no significant difference between groups as per their family history of hypertension (X^2=0.02, df =1, p>.05).

Regarding previous history of hypertension, data revealed that in the control group, 31(31%) subjects are having hypertension for the last 4 years and more than 4 years; 24(24%) were having for the last 3 years; 21(21%) were having for the last 2 years and rest 24 (24%) were having hypertension for the last one year or less than one year. In the experimental group, majority of subjects i.e. 28(32.2%) were having hypertension for the last one year or less than one year; 22 (25.3%) were having for the last 2 years; 18 (20.7%) were having for the last 3 years and rest 19 (21.8%) were having hypertension the last 4 years and more than 4 years (Figure 5.12). But there is no significant difference between groups as per their previous history of hypertension (X^2=0.02, df =1, p>.05)

According to history of co morbid diseases, in the control group, majority subjects i.e. 54 (54%) subjects are not

having any co-morbid disease; 37 (37%) had history of Diabetes; 7 (7%) had Dyslipidemia; 1 (1%) had renal failure; and 1 (1%) had history of having COPD. In the experiment group also majority of subjects i.e. 47 (54%) subjects are not having any co-morbid disease; 21 (24.1%) had history of Diabetes; 18 (20.7%) had Dyslipidemia; and 1 (1.1%) had history of having COPD (Figure 5.13). There is a significant difference between groups as per their history of co morbidity (X^2=9.88, df =4, p<.05).

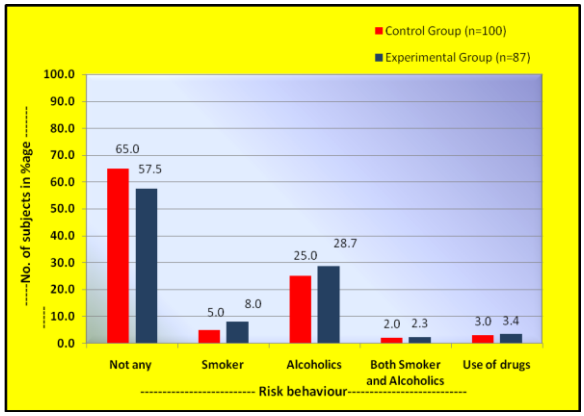

Figure 1: Distribution of subjects of experiment and control groups according to their risk behaviour

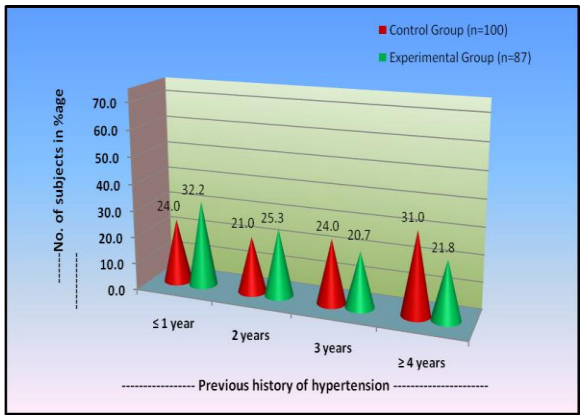

Figure 2: Distribution of subjects of experiment and control groups according to their previous history of hypertension

The data revealed that majority of subjects i.e. 91 (91%) and 70(80.5%) in control and experiment group respectively were known hypertensive (Figure 5.14), and there is no significant difference (X^2=3.48, df =1, p>.05).According to hospitalization, majority of subjects in both groups i.e. 84 (84%) & 72 (82.2%) of control and experiment group respectively were not hospitalized (Figure 5.15) and there is no significant difference between groups (X^2=0, df =1, p>.05). As per the treatment modalities, majority of subjects i.e. 66 (66%) of control group were on medications; 21 (21%) were on dietary modification; and rest 13 (13%) were practicing exercises. In the experiment group also majority of subjects i.e. 55 (63.2%) were on medications; 20 (23%) were on dietary modification; and rest 12 (13.8%) were practicing exercises (Figure 5.16). There is no significant difference between groups as per their treatment modalities (X^2=0.16, df =2, p>.05). Thus the data shows that both control and experiment group are homogenous according to their life style and clinical profile variables except co morbidity profile.

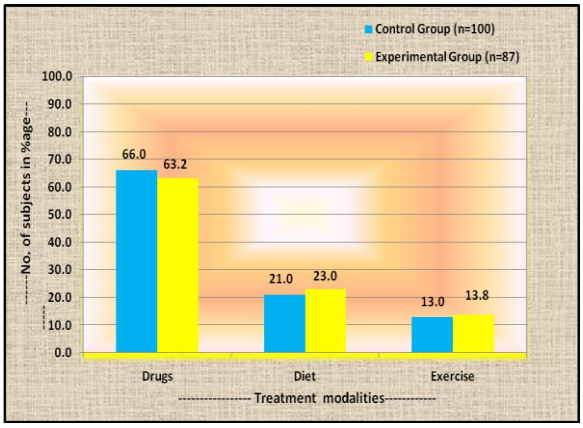

Figure 3: Distribution of subjects of experiment and control groups according to their treatment modalities

Table 3 depicts distribution of subjects according to pre and post test stress scores of experimental and control group.

Data revealed that in the pre test, out of 87 subjects in experiment group, 40 (46%) subjects had moderate stress, 47 (54%) had severe stress level and none had minimal or mild stress. After intervention, during post test, 52 (59.8%) subjects had minimal stress level and rest 35 (40.2%) had mild stress level and none had moderate or severe stress level (Figure 5.19).

In control group, out of 100 subjects, 66 (66%) subjects had severe stress, and 34 (34%) had moderate stress and none had minimal or mild stress. During post test, without any intervention, 63 (63%) subjects

had severe stress and 37(37%) had moderate stress and none had minimal or mild stress (Figure 5.20).

Table 3: Distribution of subjects according to their stress level in pre and post intervention period of experimental and control group

Level of stress	Experimental Group (n=87)		Control Group (n=100)		Chi Square and p Value
	F	%	f	%	
Pre-test					
Minimal	0	0.0	0	0.0	2.79, df =1
Mild	0	0.0	0	0.0	0.095 NS
Moderate	40	46.0	34	34.0	
Severe	47	54.0	66	66.0	
Post-test					
Minimal	52	59.8	0	0.0	
Mild	35	40.2	0	0.0	1.87E+02, df=3
Moderate	0	0.0	37	37.0	0.000*
Severe	0	0.0	63	63.0	

NS - Not Significant * P<0.05

The data further revealed that according to stress level of subjects, during pre test there was no significant difference between experiment and control group, but in the pre test, there is highly significant difference in their stress level. The stress level of experiment group was reduced remarkably after Yoga intervention as compared to control group. Hence the hypothesis 'There will be a significant difference between pretest and posttest scores of stress of hypertensive clients in experimental and control group at $p \leq 0.05$ level' is accepted and other null hypothesis is rejected.

Table 4: Comparison of pre test and post test stress scores in experimental and control groups

	Stress scores						Independent 't' test p value
	Experimental Group (n=87)			Control Group (n=100)			
	Range	Mean ±SD	Mean %	Range	Mean ±SD	Mean %	
Pre-test	24-34	30.3 ±2.32	75.8	23-34	30.6 ±2.43	76.5	0.835, df =185 0.41 NS
Post-test	7-13	10.3 ±1.45	25.8	23-37	30.8 ±2.53	77.0	66.72, df= 185 0.000*
Paired 't' test	68.80, df= 86 0.000*			1.91, df =99 0.059 NS			

NS - Not significant *p<.05 significant

Table 4 show the pre test and post test stress scores of subjects of experimental and control group. In experimental group (n=87), the pre test stress score of subjects ranging 24-34, with mean score 30.3 ± 2.32 and mean percentage 75.8 and after Yoga, the post-test stress scores were ranging 7-13 with mean score 10.3±1.45 and mean percentage 25.8. There was statistically highly significant difference between pre and post stress scores among the subjects ('t'=68.8, p<0.000).

While in control group (n=100), the pre test stress score of subjects ranging 23-34 with mean score 30.6±2.43 and mean percentage 76.5 and the post-test stress without administering Yoga, was ranging 23-37 with mean score 30.8± 2.53 and mean percentage 77.0. Statistically there was no difference between pre and post stress scores among the subjects ('t'=1.91, p=.059).

The data also revealed that there was no statistically significant difference between the pre test stress scores of subjects of control groups ('t'=0.835, p=.41) but found statistically highly significant difference in post test stress scores of subjects of experimental groups ('t'=66.72, p=0.000)

Table 5: Pre-test stress scores of subjects in experimental group according to their selected demographic variables

Demographic variables	Pre test stress scores (0-40) Experiment group(n=87)				
	N	Mean	± SD	Mean %	ANOVA
Age (in years)					
20-35	16	30.6	2.0	76.4	0.314, df =3/83 0.82 NS
36-50	28	30.0	2.7	74.9	
51-65	26	30.3	2.0	75.9	
>65	17	30.5	2.4	76.3	
Gender					
Male	38	30.3	2.2	75.8	0.004,df=1/85, 0.95 NS
Female	49	30.3	2.5	75.7	
Educational status					
Primary	28	30.0	2.4	75.1	0.698, df =4/82 0.60 NS
Middle	21	30.5	2.2	76.3	
10+2	15	30.4	3.0	76.0	
Graduate	21	30.6	1.9	76.4	
Post graduate or above	2	28.0	0.0	70.0	
Marital status					
Married	72	30.5	2.3	76.3	2.146, df = 2/84 0.12 NS
Unmarried	8	29.0	2.2	72.5	
Widow/Widower	7	29.4	2.8	73.6	
Religion					
Hindu	18	30.1	2.2	75.3	0.147, df=1/85 0.70 NS
Sikh	69	30.3	2.4	75.9	
Occupational Status					
Employed	28	30.6	1.9	76.5	2.257, df= 3/83 0.09 NS
Unemployed	50	30.2	2.4	75.6	
Business	4	27.8	3.8	69.4	
Labourer	5	31.4	1.5	78.5	
Type of Family					
Nuclear	45	30.0	2.4	75.1	0.705, df =2/84 0.50 NS
Joint	38	30.6	2.2	76.6	
Extended	4	30.3	1.9	75.6	
Family monthly Income					
Rs ≤ 10,000	49	30.3	2.5	75.7	2.257, df= 3/83 0.09 NS
Rs 10,001-15,000	18	29.6	2.2	73.9	
Rs 15,001-20,000	14	31.1	1.8	77.9	
Rs ≥ 20,001	6	30.7	1.4	76.7	

NS - Not significant

The data presented in Table 5 shows pre-test stress scores of subjects of experimental group according to their selected demographic variables. The data revealed according to age, out of maximum 40 stress scores, the average pre test stress scores ranges 30.0± 2.7 to 30.6± 2.0. The subjects of age group 20-25 years, and more than 60 years had the highest stress scores i.e. 30.6± 2.0 (mean%=76.4) average stress scores and the least was scored by the subjects of 36-40 years. But age wise statistically, there was no significant difference of their stress scores (ANOVA= 0.314, df =3/83, p=0.82).

Gender wise, the data shows that out of 40, the average pre test stress scores of both male and female subjects were 30.0±2.2 & 30.0±2.5 respectively. Statistically also there was no significant difference in their stress level (ANOVA= 0.004, df=1/85, p>.05).

According to educational status, there is no significant difference in their pre test stress level (ANOVA= 0.698, df=4/82, p=.60). The post graduate subjects (mean=28± 0.0, mean %=70.0) had less stress than subjects with graduation qualification (mean= 30.6±1.9, mean % =76.4) or middle passed (mean=30.5± 2.2, mean %=76.3).

The data also revealed that according to marital status, there is no significant difference in the pre test stress scores (ANOVA= 2.146, df=2/84, p=.12) of subjects understudy in the experimental group. The married subjects had more stress (mean=30.5± 2.3, mean %=76.3) than unmarried (mean= 29.0±2.2, mean % =72.5) or widowers (mean= 29.4±2.8, mean % =73.6).

According to occupation, the data shows that out of 40, the average pre test stress scores of subjects having business had less stress (27.8±3.8) than who were unemployed (30.2±2.4), or employed (30.6±1.6). The highest average stress was found among labourer (mean%=78.5). But statistically there was no significant difference in their stress level (ANOVA= 2.257, df=3/83, p=.09).

According to type of family, the data shows that the average pre test stress scores ranges 30.0±2.4 to 30.6 ±2.2. Comparatively, subjects living in joint family had more stress than subjects living in nuclear family or extended family. However statistically, there was no significant difference in their stress level (ANOVA= .705, df=2/84, p=0.50).

The data also revealed that monthly income wise, there is no significant difference in the pre test stress scores (ANOVA= 2.257, df=3/83, p=0.09) of subjects understudy in the experimental group. The subjects having monthly income 15,001/- to 20,000/- had comparatively more stress (mean=31.1± 1.8, mean %=77.9) than subjects having less or more monthly income.

Table 6: Post-test stress scores of subjects in experimental group according to their selected demographic variables

Demographic variables	Post test stress scores (0-40) Experiment group(n=87)				
	N	Mean	± SD	Mean %	ANOVA
Age (in years)					
20-35	16	9.8	1.5	24.5	1.312, df 3/83 p=0.28 NS
36-50	28	10.5	1.4	26.2	
51-65	26	10.1	1.6	25.3	
>65	17	10.7	1.2	26.8	
Gender					
Male	38	10.4	1.4	25.9	0.208, df =1/85 p=0.65 NS
Female	49	10.2	1.5	25.6	
Educational status					
Primary	28	10.3	1.3	25.7	5.308, df= 4/82 p=0.001*
Middle	21	9.5	1.1	23.7	
10+2	15	11.5	1.1	28.8	
Graduate	21	10.2	1.6	25.5	
Post graduate or above	2	10.5	2.1	26.3	
Marital status					
Married	72	10.3	1.4	25.8	0.042, df 2/84 p=0.96 NS
Unmarried	8	10.3	2.3	25.6	
Widow/Widower	7	10.1	1.2	25.4	
Religion					
Hindu	18	9.9	1.2	24.9	1.268, df=1/85
Sikh	69	10.4	1.5	25.9	0.26
Occupational Status					
Employed	28	10.1	1.5	25.4	0.676, df=3/83 0.57 NS
Unemployed	50	10.3	1.4	25.8	
Business	4	11.3	1.0	28.1	
Labourer	5	10.2	2.2	25.5	
Type of Family					
Nuclear	45	10.0	1.4	25.0	2.339, df=2/84 0.10 NS
Joint	38	10.5	1.5	26.3	
Extended	4	11.3	1.0	28.1	
Family monthly Income					
Rs ≤ 10,000	49	10.4	1.4	26.0	2.245, df= 3/83 0.09 NS
Rs 10,001-15,000	18	10.4	1.7	26.0	
Rs 15,001-20,000	14	10.4	1.2	26.1	
Rs ≥ 20,001	6	8.8	1.0	22.1	

NS - Not significant * p<.05 Significant

Table 6 depicts post-test stress scores of subjects of experimental group according to their selected demographic variables. The data revealed according to age, out of maximum 40 stress scores, the average post test stress scores ranges 9.8± 1.5 to 10.7± 1.2. The subjects of age group 20-25 years, had the least stress scores i.e. 9.8± 1.5 (mean%=24.5) and the highest stress was scored by the subjects of age

group more than 60 years. But statistically, there was no significant difference of their stress scores (ANOVA=1.312, df =3/83, p=0.28).

Gender wise, the data shows that out of 40, the average post test stress scores of both male and female subjects were 10.4±1.4 & 10.2±1.5 respectively. Statistically also there was no significant difference in their stress level (ANOVA= 0.208, df=1/85, p=0.65).

According to educational status, there is significant difference in their post test stress level (ANOVA= 5.308, df=4/82, p=.001). The post graduate and above qualified subjects (mean=10.5± 2.1, mean %=26.3) had more stress than graduates (mean= 10.2±1.6, mean % =25.5) or middle passed (mean=9.5± 1.1, mean %=23.7).

The data also revealed that according to marital status, there is no significant difference in the post test stress scores (ANOVA= .042, df=2/84, p=.96) of subjects understudy in the experimental group.

The post-test stress scores of subjects of experimental group according to their other selected demographic variables. The data revealed according to religion, out of maximum 40 stress scores, the average post test stress scores ranges 9.9± 1.2 to 10.4± 1.5. The subjects belong to Sikh community had slightly higher stress scores (mean%=25.5) than subjects belong to Hindu religion (mean%= 24.9). But statistically, there was no significant difference in their stress scores (ANOVA= 1.268, df =1/85, p=.26).

According to occupation, the data shows that out of 40, the average post test stress scores of subjects having business had more stress (11.3±1) than who were unemployed (10.3±1.4), or employed (10.1±1.5). The highest average stress was found among businessmen (mean%=28.1). But statistically there was no significant difference in their stress level (ANOVA= .676, df=3/83, p=.57).

According to type of family, the data shows that the average post test stress scores ranges 10±1.4 to 11.3 ±1.0. Comparatively, subjects living in extended family had more stress than subjects living in nuclear family or joint family. However statistically, there was no significant difference in their stress level (ANOVA=2.339, df=2/84, p=0.10).

The data also revealed that monthly income wise, there is no significant difference in the post test stress scores (ANOVA= 2.245, df=3/83, p=0.09) of subjects understudy in the experimental group. The subjects having monthly income >20,000/- had comparatively less stress (mean=8.8± 1.0, mean %=22.1) than subjects having less monthly income.

This finding is supported by a study conducted by Alvazian TA, Zaitsev (2010) on progressive muscle relaxation therapy in essential hypertension and stress among 171 hypertensive patients. The analysis of BP dynamic during 6 week revealed significantly ($p<0.001$) systolic BP (−10.4±0.8) and diastolic BP (−7.7+0.6) by the end of one year control group BP returned to the initial level. BP reduction has been found in 62% of patients in the main group and only 12% of patients of the control group. The study concluded that relaxation therapy is effective in reducing BP and stress.[16]

CONCLUSION

A short Yoga program for patient to practice at home seems to have an antihypertensive effect, as well as a positive effect on self rated quality of life and reduction of stress. This implies that simple yoga exercises may be useful as a supplementary Blood pressure therapy in addition to medical treatment when prescribed by primary care physicians. It also lowered the patient's perception on stress and it enhanced the patient's perception on health. The One could also speculate as to whether these in longs run could influence medicine intake, side effects and drug costs.

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How to cite this article: Bajwa AK. An intervention study to assess the impact of yoga therapy on level of stress among Hypertensive clients at urban centre of SGRD Hospital, Amritsar. Int J Health Sci Res. 2019; 9(3):194-207.

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