

(RESEARCH ARTICLE)



Evaluate the determinants of blood pressure from intervention for prehypertensive workers

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Abstract

Introduction: The aim of study is to prevent hypertension by Lifestyle Modification. Pre hypertensive adults must have adequate knowledge about the disease condition and the right practice regarding lifestyle modification to prevent hypertension. Hypertension cannot be eliminated because there are no vaccine to prevent the development of hypertension but its incidence can be decreased by reducing its risk factors.

Materials and Methods: An Experimental One Group Pre-test Post- test design study was conducted to assess the effectiveness of Intervention on blood pressure of pre hypertensive employees in selected industries. The objectives of the study is to assess an compare the level of blood pressure of pre hypertension employees in selected industries. After pretest of blood pressure, Intervention was given for a period of one weeks. It includes wellness training for a period of 12 hours in each industry. At the end of the 7th week outcome measures on blood pressure level was measured with the participants. Among the selected 120 samples the Intervention was found to be effective in maintaining blood pressure.

Results: There was a highly significant difference between pretest and post test on blood pressure level.

Discussion: The study concludes that Intervention is a cost effective method of Blood Pressure control measure that can be practiced at home set up without any equipment The published work is a part of Tamilnadu Dr. MGR Medical University Chennai.

Keywords: Determinants; Blood pressure; Employees; Prehypertension

1. Introduction

Blood Pressure is measured in millimeters of mercury (mm Hg) and is registered as two numbers, usually written one above the other. The upper number is the Systolic Blood Pressure (SBP), the highest pressure in blood vessels that occurs when the heart contracts or beats. The lower number is the Diastolic Blood Pressure (DBP), the lowest pressure in blood vessels in between heartbeats when the heart muscle relaxes. Young (2013) states that wellness exercises such as Meditation can be easily carried at the desk and it has a wide range of benefits such as feeling of calmness and wellbeing, relaxation and improvement in breathing, mental clarity that enables innovative thinking and is changing negative habits which improve in turn self-esteem [8].

A study on the effect of Tai Chi Training, twice weekly for 6-12 weeks 10,749 participants proves 20 minutes Warm Up and 10 minutes Cool Down exercises improves cardio respiratory function and reduces osteoarthritis and have positive

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effect on BP and blood sugar. The study concludes that tai chi is a lifestyle intervention that aids in reducing cardiovascular risk and high BP. Tai Chi can be trained on the basis of its ability to modulate autonomic functions, It also relieve stress, improving physiological functions and improve quality of life [3].

1.1 Background of the study

Canadian Centre for Occupational Health and Safety (2010) report shows that wellness programs have become very common as 92% of employers with 200 or more employees. Survey data indicates that most frequently targeted behaviour are exercise (63%), smoking (60%) and weight loss (53%). In spite of wide spread availability the actual participation of employees in such programs remains limited to 20% according to non representative survey. ²Galloway (2015) expressed that a nurse has major responsibility to ensure that the health promotion practices. And also correct and makes a significant positive contribution to the optimum well being of the people. As a professional nurse, it is expected that one should possess the knowledge and skills to meet the needs of an individual or a group.

1.2 Significance of the study

The WHO report 2009 shows deaths as a result of hypertension will increase by 17% with the greatest increase in the African region (27%). Worldwide high BP is estimated to cause 7.1 million of deaths. However primary prevention of hypertension intervention has been proposed as the most cost effective approach to the emerging epidemic (Maher, Smeeth & Sekajuga 2010). ¹Arnall, Fleischmann and Friedrich (2015) surveys shows that at least two in three American workers are regularly presented with poor lifestyle habits such as unhealthy food at work through vending machines and celebrations. Nearly 20,000 employees (93%) found those who report rarely eating healthy foods including fruits and vegetables and more likely to have higher loss in productivity. Physical inactivity, stress and unhealthy diet which increase the risk of high BP, often are part of the work environment.

⁴Lekshimi and Lobisha (2017) conducted a study to assess the level of BP and quality of life about 40 workers with high BP. Coolie, business, teachers and health professionals were participated in selected community at Kanyakumari district. Demographic variables, clinical variables, BP, Modified WHO Quality of life scale was used as tool. The result showed that majority (45%) belongs to 41-48 years of age, 52.5% were females, 100 % were christians, 42.5% completed middle school education, 75% were coolie. Regarding clinical data 45% had smoking habit, 33.5% had five years of smoking experience, 17.5% adults had normal blood pressure 50 % had prehypertension and 17.5% had hypertension stage one, and 15% had hypertension stage two, 52.5% were obese. Majority 90% had moderate level of quality of life. 50% had pain and discomfort, 42.5% had fatigue. The correlation between the level of SBP and quality of life score 'r' value was 0.589. The correlation between the level of DBP and Quality Of Life score 'r' value was 0.674. There was a significant association found between SBP and age ($\chi^2=17.72$), gender ($\chi^2=20.57$), education ($\chi^2=12.9$), occupation ($\chi^2=15.59$), income ($\chi^2=10.23$), smoking ($\chi^2=22.76$), weight ($\chi^2=7.67$), BMI ($\chi^2=18.21$). There was a significant association found between DBP and age ($\chi^2=0.08$), education ($\chi^2=4.22$) occupation ($\chi^2=2.44$), income ($\chi^2=6.18$), smoking ($\chi^2=3.38$).

Objectives of the study

To assess and compare the pre and post-test score on level of blood pressure regarding prevention of hypertension among employees.

1.3 Hypotheses

1.3.1 H1

There will be a significant difference between pre and post-test score on level of blood pressure regarding prevention of hypertension among employees.

2. Materials and methods

2.1 Research Approach

Quantitative research approach using pre-test and post-test was adopted to accomplish the objectives of the study.

2.2 Research Design

Pre-Experimental One Group Pre-test -Posttest design.

2.3 Variables

Dependent variables of this study were level of blood pressure. Independent variable of this study was Wellness Intervention on prevention of hypertension.

2.4 Research Setting

Industrial waiting hall was used to assemble the group, selection of samples, getting consent, giving instructions, and implement Wellness intervention

2.5 Population

The accessible population of the study was all employees who agreed to participate in the selected Cashew nut Processing Industries.

2.6 Sample size and attrition

The sample size of 120 pre hypertensive employees were estimated to find out the effectiveness of Wellness Intervention based on sample size for studies comparing a prevalence with a hypothesis value. Study on Barathy (2007) estimated a prevalence of pre hypertension was 44% among employees. The estimated sample size was 107 with 90% power(confidence) at 15% (margin error) level of significant. Considering the chance of attrition, an increase of 10% was done and the obtained value was rounded to 120. A total of 120 samples were selected for the intervention part study.

2.7 Criteria for sample selection

2.7.1 Exclusion criteria

The pre hypertensive employees who were

- who were having any past and present medical conditions such as hypertension, diabetes mellitus, dyslipidemia, Ischemic heart disease, kidney disease, stroke, rheumatic heart disease and joint disease, asthma, tuberculosis, epilepsy, and deformities in right arm.

2.7.2 Sampling Technique

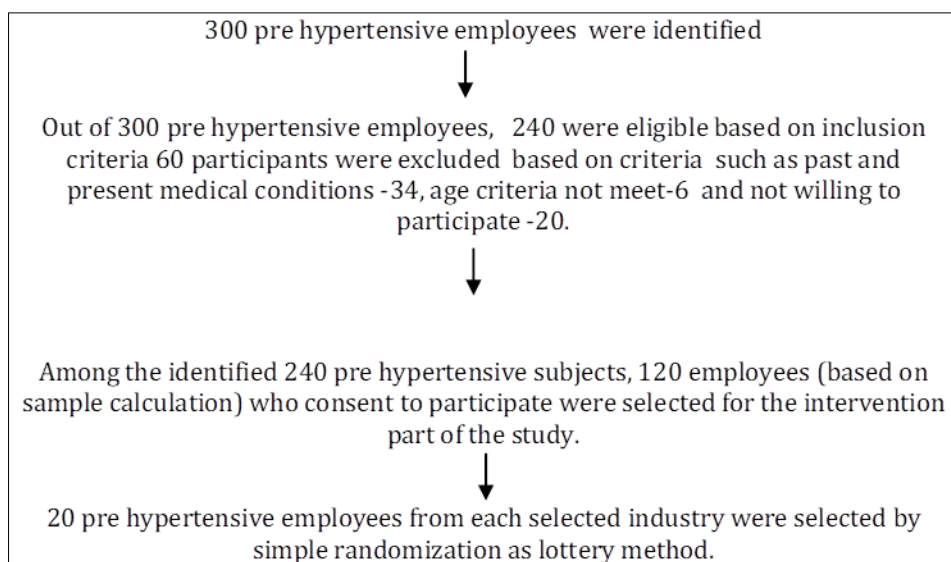


Figure 1 Schematic representation of sampling technique

2.8 Research Tool

The following instruments were prepared and used by the investigator based on the objectives of the study. Extensive review of literature, discussion, and views of experts, enhanced the development of the tool

Table 1 Tools and Techniques of Research

S. No.	Tools	Administration technique	Purpose
1	Self-Reported Questioning Survey Demographic Variables	-	Assessment of demographic variables of Pre hypertensive employees.
2	Level of Blood Pressure measured (Blood Pressure measurements with digital Blood Pressure monitor)	<i>In Vivo</i> biophysiologic methods	Assessment of level of Blood Pressure among employees.

Blood Pressure level was measured among selected employees. The digital Blood Pressure monitor was used to measure the Blood Pressure level.

- The level of BP score was interpreted as
- 120-139 mm of Hg → Systolic pre hypertension
- 80- 89 mm of Hg → Diastolic pre hypertension
- 130-139 mm of Hg Systolic and 80-89 mm of Hg Diastolic BP ⇒ Both Systolic and Diastolic pre hypertension

2.9 Description of the Intervention

In wellness training, learning phase involves two hour session (one hours during morning and evening per day), held for five days from 2nd to 5th week. This includes demonstration of wellness exercises by the researcher and return demonstration by the employees with pre hypertension. At the end of the training playing Digital Video Disk entitled 13 warmup Yang style authentic Taiji exercises with background music in Laptop. In continuation phase involves clarification of doubts and information was given to the group about wellness programme and follow up and assessment of employee's performance of wellness exercises. It includes two hours session held one day form the 6st week. The participants were asked to practice wellness exercises daily for at least 5 days/week form 7th weeks onwards at home. The time plan of Wellness Intervention as follows in table 2.

Table 2 The plan of wellness programme

Weeks / Day	Content	Duration
1 st week/ Day 1	Wellness education regarding prevention of hypertension by lecture cum discussion and distribution of wellness module, playing suggested Digital Video Disk on Tai Chi Form 13 exercises with background music.	2 hours
2 nd to 5 th week/Day 2 to day 5	Wellness training involves demonstration by the investigator and remonstrations by the participants of selected wellness exercises and correction made by the investigator. Playing suggested Digital Video Disk on Tai Chi Form 13 exercises with background music.	8 hours
6 th week/ Day 6	Clarification of doubts. Information was given to the group about variety of exercises and follow up and assessment of employee's performance of wellness exercises.	2 hours
7 th week	Home practice by the participants.	

2.10 Content Validity and Reliability of the Tool

Digital Blood Pressure monitor was calibrated from department of Biomedical Engineering.

2.11 Ethical consideration

Content validity was received from the various experts by the Investigator. Wellness Intervention Programme was administered to all sample subjects in a same manner.

2.12 Method of Data Collection Procedure

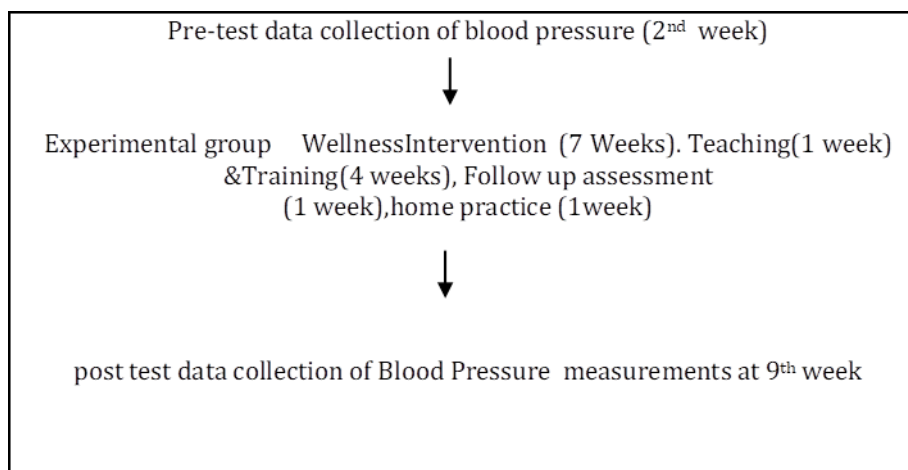


Figure 2 Schematic Representation of Data Collection Procedure

2.13 Plan for data analysis

Frequency percentage distribution, mean and standard deviation was used to assess the knowledge and Paired 't' test was used to compare the blood pressure level.

3. Results

3.1 Assessing and Comparing the Pretest and Post- test scores on level of blood pressure regarding Prevention of Hypertension among Pre-Hypertensive Employees

This section deals with pretest and post- test BP score of sample subjects.

Table 3 Overall assessment of pretest and post -test blood pressure scores of sample subjects

Sr. No	Inference from BP		Range of score (mm of Hg) (Max-Min)	Pre-test (n=120)			Post- test (n=120)		
				f	cf	%	f	cf	%
1	Systolic blood pressure (n=120)	Normal	100-119	41	41	34.16	97	97	80.83
		Systolic pre hypertension	120-139	79	120	65.83	23	120	19.16
2	Diastolic blood pressure (n=120)	Normal	70-79	43	43	35.83	94	94	78.33
		Diastolic pre hypertension	80-89	77	120	64.16	26	120	21.66

Table shows that the pre-test 65.83 % of samples had Systolic pre hypertension, 34.16% of subjects had normal Systolic blood pressure. In post- test 80.83% subjects had normal Systolic blood pressure and 19.16 % of employees had Systolic pre hypertension. The pre-test result of the Diastolic blood pressure shows 64.16 % of employees had Diastolic pre hypertension and 35.83% had normal Diastolic blood pressure. In post- test 78.33% had normal Diastolic blood pressure and 21.66% had Diastolic pre hypertension.

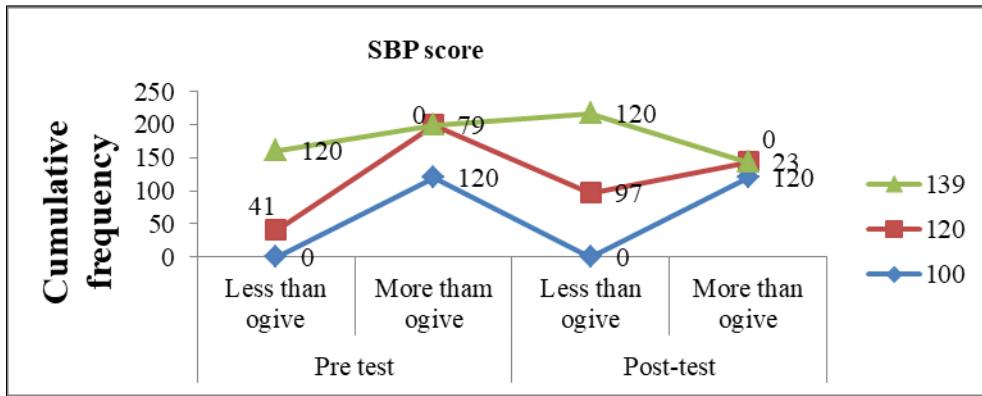


Figure 3 Line diagram representing the comparison of pre-test and post – test Systolic blood pressure score in sample subjects

The pre-test 65.83 % of samples had Systolic pre hypertension, 34.16% of subjects had normal Systolic Blood Pressure. In post- test 80.83% subjects had normal Systolic Blood Pressure and 19.16 % of employees had Systolic pre hypertension. Line diagram representing the comparison of pre-test and post – test cumulative frequency score. The pre -test less than ogive score are (0&41&120) & more than ogive score are (120&79&0). The post- test less than ogive score are (0&97&120) & more than ogive are (120&23&0).

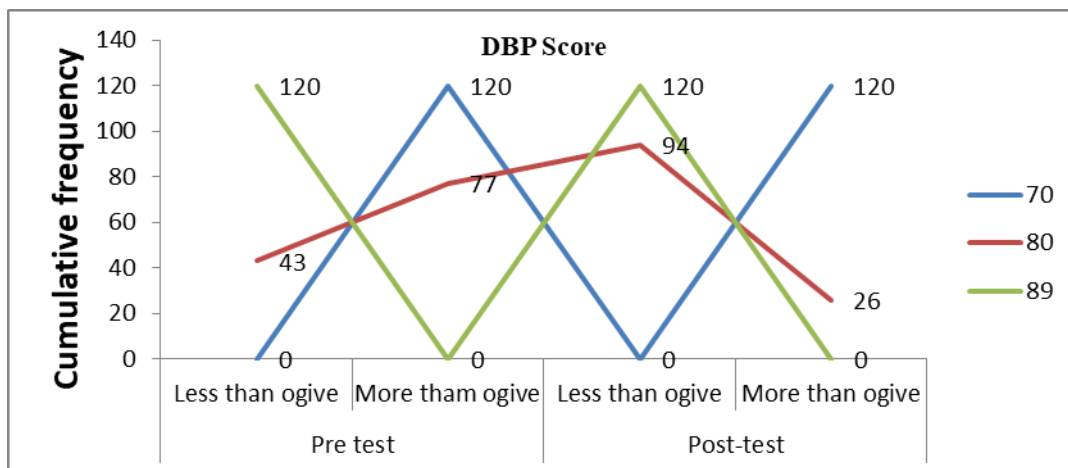


Figure 4 Line diagram representing the comparison of pre-test and post – test DBP score in sample subjects

Diastolic pre hypertension and 35.83% had normal Diastolic Blood Pressure. In post- test 78.33% had normal Diastolic Blood Pressure and 21.66% had Diastolic pre hypertension. Line diagram representing the comparison of pretest and post – test Diastolic Blood Pressure cumulative frequency score in sample subjects. The pre -test line of less than ogive are (0&43&120) & more than ogive are (120&77&0). The post- test line of less than ogive (0&94&120) & more than ogive are (120&26&0).

This Line diagram represents the post -test line lies of the pre-test cumulative frequency scores over the entire range showing that the post- test scores are consistently higher than the pre-test scores. The changes in BP are evident by the distance separated by the lines at various levels.

3.2 Finding related to Effectiveness of Wellness Intervention on Level of Blood Pressure score of Pre Hypertensive Employees

Comparison of sample according to pre and post- test scores on Blood Pressure among pre hypertensive employees. Mean difference and paired ‘t’ test value of Blood Pressure scores are presented in table 4.

Table 4 Over all comparison of pre-test and post -test Blood Pressure scores of sample subjects

S.no	Overall BP scores	Pre-test	Post- test	Mean difference	Paired “t” test	Level of significance
		Mean \pm SD	Mean \pm SD			
1	Systolic Blood Pressure n = 120	131.82 \pm 7.08	122.50 \pm 6.37	9.32	14.38	Table value(118) \geq 3.37 p>0.001 significance at 0.1% level
2	Diastolic Blood Pressure n=120	83.54 \pm 6.46	79.06 \pm 6.36	4.47	10.38	

Table shows the pretest reveals that the overall Systolic Blood Pressure score of sample subjects mean difference was 9.32. There was more reduction in mean difference in the Systolic Blood Pressure in post- test than in pretest. The paired t test score 14.38 was higher than the table value. This show the significant difference between the pre-test and post-test Systolic Blood Pressure score at 0.1% level. The mean reduction in the pretest and post- test Diastolic Blood Pressure score was 4.47. The paired “t” test score 10.38 was higher than the table value. This shows the significant difference between the pre and post - test Diastolic Blood Pressure score at 0.1% level.

4. Discussion

The above findings were supported by the studies of Sangeetha, (2016) conducted a Quasi Experimental Study to assess the effectiveness of Progressive Muscle Relaxation Technique on selected parameters in high BP among adults residing at selected urban areas of Tuticorin district, Tamil Nadu. Thirty samples was selected by purposive sampling technique. Pre-test was done among both experimental and control group by checking BP, pulse rate, respiratory rate, stress level and wellbeing. Progressive Muscle Relaxation Technique was administered for experimental group participants for twenty days and were monitored by the investigator for the regular practice of Progressive Muscle Relaxation Technique. After investigation post-test was done on the twenty first day. The pre-test mean score for Systolic Blood Pressure was 143.33 and Diastolic Blood Pressure was 94.67. Pulse rate was 88, respiratory rate was 23.35, stress level was 26 and psychological well-being was 57.47. The post- test mean scores for Systolic Blood Pressure was 116, Diastolic Blood Pressure was 76, pulse rate was 75.13, respiratory rate was 18.60, stress level was 15.90 and psychological well being was 19.33. There was significant decrease in SBP, Diastolic Blood Pressure, pulse rate, respiratory rate and stress level and there was an increase in the well being. The experimental group pre-test mean for Progressive Muscle Relaxation Technique practice was 5.97 with SD 1.974 and post-test practice mean was 14.73 with SD 0.583 at the level of P<0.001 which showed significant increase in practice of Progressive Muscle Relaxation Technique among adults who attended regularly.

Present study findings also supported by the literature of Sujatha (2015) conducted a True Experimental Study to assess the effectiveness of Yoga and Need based Educational Intervention on BP, BMI, cholesterol, anxiety and stress among sedentary, moderate and heavy workers with high Blood Pressure at Kattakulathur Block, TamilNadu [7]. Two hundred and thirty eight samples were selected by simple random and grouped 118 for experimental group and 120 for control group. Pre-test on bio physiological measurements, anxiety and stress was done. Yoga practice conducted by using lecture, demonstration, and discussion method with audio visual aids (booklet and video). After intervention post test was measured in the 12th week with the same tool. The finding shows in both group 74% are obese, 70% had boarder line cholesterol, 75% have moderate level of anxiety and 54% have level of stress during pretest. After intervention there was a slightly significant difference between study and control group. In study group Systolic Blood Pressure, Diastolic Blood Pressure, Body Mass Index, High Density Lipoprotein, Low Density Lipoprotein, Triglycerides, Very Low Density Lipo protein, Total cholesterol, anxiety and stress levels are 14.24 mm Hg, 8.82 mm Hg, 1.54 Kg/ m². 4.92 mg/dl, 21.56mg/dl, 15.09mg/dl, 5.92mg/dl, 25.9 mg/ dl, 11.9% and 13.2% respectively. Where as in control group minimal changes observed. There was a positive correlation between the cholesterol and anxiety, Systolic Blood Pressure and anxiety, Diastolic Blood Pressure and anxiety, cholesterol and stress, Systolic Blood Pressure and stress, Diastolic Blood Pressure and stress in study group in pre and post- test. The significant relationship was found between Blood Pressure, Body Mass Index. cholesterol, anxiety, stress with demographic variables such as age, gender, working pattern, duration of high Blood Pressure at p<0.01 level.

5. Conclusion

The present study concluded that adult human beings aware of the experiences that most affect their life choices helps them regular practice of wellness exercises maintain the optimal level of Blood Pressure.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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