Effect of Foot Reflexology on Vital Parameters of Hypertensive Patients

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Abstract

Reflexology is a natural healing therapy which is highly effective in treating many health complaints. Foot reflexology promotes equilibrium and well-being in hypertensive patients with long lasting impact. A quasi experimental study was adopted to assess the effect of foot reflexology on vital parameters among hypertensive patients in the selected hospitals of Indore. 60 hypertensive patients (30 in experimental group and 30 in control group) were selected by purposive sampling from medical surgical wards of Choithram hospital and research centre, Indore. Data were collected through questionnaire for socio- demographic variables and clinical variables. For checking blood pressure mercury sphygmomanometer was used and pulse rate and respiratory rate was checked by observational method .Vital parameters recorded in recording sheet and categorized according to vital parameters assessment sheet. The data were analyzed in terms of objectives and hypotheses using descriptive and inferential statistics. Findings of the study revealed that there was significant difference between pretest scores values of vital parameters and post test scores values of vital parameters the at the level of $p< 0.001$. The mean difference in pulse rate among pretest score and post test score was 22.6. This test result showed that it was highly significant at the level $p<0.001$. In the case of respiratory rate the calculated mean difference was 5.6 and it was found to be significant at $p<0.005$. The mean difference in blood pressure scores was 1.68 and this was also found to be highly significant at the level of $p<0.001$. On comparison of post test scores of vital parameters among experimental and control group after foot reflexology it revealed that there was significant difference between two groups at the level $p<0.001$.This study results showed that the application of foot reflexology techniques reduces the increased vital parameters and help to keep the normal levels especially that of the blood pressure. Foot reflexology is an adoptable intervention to holistic nursing.

Key words: Foot reflexology, vital parameters, Hypertensive patients.

Background

Hypertension, also known as high or raised blood pressure, is a condition in which the blood vessels have persistently raised pressure. Blood pressure is created by the force of blood pushing against the walls of blood vessels (arteries) as it is pumped by the heart. Normal adult blood pressure is defined as a blood pressure of 120 mm Hg, when the heart beats (systolic) and a blood pressure of 80 mm Hg when the heart relaxes (diastolic). When systolic blood pressure is equal to or above 140 mm Hg and/or a diastolic blood pressure equal to or above 90 mm Hg the blood pressure is considered to be raised or high.[1]

Hypertension is a global public health issue. It contributes to the burden of heart disease, stroke, kidney failure and premature mortality and disability. Hypertension rarely causes symptoms in the early stages and many people go undiagnosed. Those who are diagnosed may not have access to treatment and may not be able to successfully control their illness over the long term. Hypertension is a silent, invisible killer. Researchers have estimated that raised blood pressure currently kills nine million people globally, every year.[2]

Hypertension places stress on several organs (target organs), including the kidneys, eyes, and heart, causing them to deteriorate over time. High blood pressure

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contributes to 75% of all strokes and heart attacks. Uncontrolled high blood pressure can lead to heart attack, stroke, aneurysm, heart failure.[3]

Patients with a chronic illnesses like hypertension, who are suffering not only from the disease and any treatment side effects, but may also be worried and frustrated about their disease, may be open to complementary therapies as an adjunct to conventional treatments. Complementary therapies provided by health care professionals may help to fulfill patients' long term needs.[4]

In 1913, Dr. William Fitzgerald, an American doctor, discovered that pressure on one part of a zone could affect other parts of the body within that zone V.M Bechterea Russian physiologist coined the term Reflexology. Reflexology is believed to have been used for more than 4,500 years in Egypt, as pictograph evidence was found in the tomb of an Egyptian physician; some claimed that it originated in India and China Reflexology is one of the most popular CAM therapies used in Norway, Denmark, Northern Ireland, Scotland, and England.[5]

Reflexology is the application of appropriate pressure to specific points and areas on the feet, hands, or ears. Reflexologists believe that these areas and reflex points correspond to different body organs and systems, and that pressing them has a beneficial effect on the organs and person's general health. For example, reflexology holds that a specific spot in the arch of the foot corresponds to the bladder point. Reflexologists believe that by applying reflexology techniques to specific areas will increase the blood flow to the corresponding organ, via means of a specific reflexology effect. When a reflexology practitioner uses thumbs or fingers to apply appropriate pressure to this area, it affects bladder functioning. Although reflexology is not used to diagnose or cure health disorders, millions of people around the world using this to complement other treatments when addressing conditions like anxiety, asthma, cancer treatment, cardiovascular issues, diabetes, headaches, kidney function[6].

Need of the Study & Literature Review

High blood pressure (BP) is a major public health problem in India and its prevalence is rapidly increasing among both urban and rural populations. In fact, hypertension is the most prevalent chronic disease in India. The prevalence of hypertension ranges from 20-40% in urban adults and 12-17% among rural adults. The number of people with hypertension is projected to increase from 118 million in 2000 to 214 million in 2025, with nearly equal numbers of men and women are at major risk for stroke, myocardial infarction, vascular disease, and chronic kidney disease.[2]

Between 2006 and 2013, there was a 25% increase in the number of people visiting emergency rooms for essential hypertension, according to a new analysis of data from the Nationwide Emergency Department Sample. The reason for the increase, however, remained uncertain. The rate of emergency department visits also increased significantly, according to the study, rising from 190.1 visits per 100,000 population in 2006 to 238.5 visits per 100,000 population in 2013.[7]

Hypertensive patients may face financial problems in developing as well as developed countries, due to the cost of medical consultations and drug treatment, and loss of income as a result of health complications preventing them from working.[2]

In India 4% of the total population consults their general practitioner for uncomplicated hypertension every year. Antihypertensive medications and diuretics made up to 8% of all drug prescriptions. Most of the patients are unable to afford the cost of the medicine which causes drop outs.[10]

In India, during 2010-2011, almost 24000 hypertensive patients were admitted to hospitals. 43% of total hypertensive patients have complications and disabilities.4% suffering side effects of anti-hypertensive medicines[10].

There are now five major classes of antihypertensive agents which are commonly used as first-line therapy in the management of hypertension: low dose thiazide diuretics, beta-blockers, angiotensin converting enzyme inhibitors, calcium channel blockers and angiotensin II receptor antagonists. All these drugs cause side effect and are not cost effective. In India, expenditure on the treatment of all patients with mild hypertension is not cost effective. Therefore, non pharmacologic treatment is

encouraged.[11]

Complementary therapies may also help decrease health care costs because they contribute to a reduction in the number of hospitalizations, prescriptions and laboratory examinations.[12]

Complementary therapies aim to heal individuals as a whole, which means taking into account the balance of body, mind and spirit. Reflexology is one of the alternative and ancient therapies known to promote the body's own healing powers. Foot reflexology promotes equilibrium and well-being with long lasting impact.[13]

Kaye[14] conducted a study to describe the effects of deep tissue massage and foot reflexology on systolic, diastolic, and mean arterial blood pressure and respiration. A total of 263 volunteers (12% male & 88% females), with an average age group of 48.5 participated in the study for 45 & 60 minutes. Blood pressure and heart rates were measured with an automatic blood pressure cuff and respiration was observed. Results showed that there was a significant reduction of systolic pressure by 10.4mmhg ($p \leq 0.06$) diastolic pressure by 5.3mm Hg ($p \leq 0.04$) and mean arterial pressure by 10.8 beats per minute. ($p \leq 0.003$). Significant reduction in respiration was also observed.

The above cited literatures provide the evidence that hypertension is one of the most important cardiovascular risk factor but its control is still a challenge for physicians all around the globe. All Hypertensive drugs cause dizziness, ankle swelling, headache, fatigue, chest discomfort and cough. Severity of these adverse effects and attempts made to prevention and treatment of hypertension by non-pharmacological interventions like foot reflexology.

The consumption of antihypertensive drugs has been increasing day by day. Because hypertension is a life long illness, the cost of the treatment would affect the economic aspects of the Indian patients. This usually leads to non-compliance to hypertensive medicines. Reports from India indicate a noncompliance of 40% to antihypertensive medication, secondary to life threatening complications of hypertension

Foot Reflexology is an alternative approach to relieving symptoms. With an expanding research base, reflexology meets the integrative demands of combining complementary therapy and conventional medicine and is a viable component of integrative health care.

As described, complementary therapies such as massage and reflexology are claimed to help reduce symptoms of stress and tension resulting in a decrease in blood pressure, and an adjustment of body, mind and spirit to a state of harmony. This can also help improve quality of life. Today nursing is focusing on holistic health care and it is believed that introduction of complementary therapies would promote the concept of holistic nursing.

Problem Statement

A quasi-experimental study to assess the effectiveness of foot reflexology on vital parameters among hypertensive patients in selected hospitals of Indore in the year 2014-2015.

Objectives

- To assess the values of vital parameters among experimental and control group of hypertensive patients.

- To find out the effectiveness of foot reflexology on vital parameters among experimental group of hypertensive patients.

- To associate pre interventional blood pressure values of hypertensive patients with their selected socio-demographic variables.

- To associate pre interventional blood pressure values of hypertensive patients with their selected clinical variables.

- To compare the difference in vital parameters among experimental and control group after administering foot reflexology

Hypotheses

H1: There is a significant difference in pulse rate among experimental group of hypertensive patients after the administration of foot reflexology at the level of $p \leq 0.05$.

H2: There is a significant difference in respiratory rate among experimental group of hypertensive patients after the administration of foot reflexology at the level of $p \leq 0.05$.

H3: There is a significant difference in blood pressure among experimental group of hypertensive patients after the administration of foot reflexology at the level of $p \leq 0.05$.

H4: There is a significant difference in pulse rate among experimental group and control group of hypertensive patients after the administration of foot reflexology at the level of $p \leq 0.05$.

H5: There is a significant difference in respiratory rate among experimental group and control group of hypertensive patients after the administration of foot reflexology at the level of $p \leq 0.05$.

H6: There is a significant difference in blood pressure among experimental group and control group of hypertensive patients after the administration of foot reflexology at the level of $p \leq 0.05$.

H7: There is a significant association between the selected socio demo-graphic variables and severity of hypertension among hypertensive patients at the level of $p \leq 0.05$.

H8: There is a significant association between the selected clinical variables and severity of hypertension among hypertensive patients at the level of $p \leq 0.05$.

Research Methodology

Research Approach & Design: A Quantitative approach with non randomized two group pretest post-test control group design was adopted for the study.

Target population: Patients who were diagnosed with hypertension i.e. BP>140/90mmHg and admitted in medical surgical wards.

Accessible population: Patients who were diagnosed with hypertension i.e. BP>140/90mmHg and admitted in medical surgical wards of Choithram Hospital and Research Centre, Indore.

Setting: This study was conducted in medical surgical wards of Choithram Hospital and Research Centre. It is a 350 bedded multispecialty hospital with 68 general medical beds and 34 surgical beds.

Sample: 60 samples (30 in experimental group and 30 in control group) who were hypertensive and were admitted in medical wards of Choithram Hospital and Research Centre.

Sampling Technique: In this present study non randomized purposive sampling technique was used.

Inclusion criteria

- Patients diagnosed with hypertension admitted in medical wards
- Patients who are conscious and oriented.
- Patients who are able to communicate.
- Patients who are willing to participate.
- Patients who can tolerate manipulation on foot.

Exclusion criteria

- Patients having thrombotic disease of the lower extremities
- Patients with foot ulcers, foot infections or had undergone foot surgery
- Patients, who had recent major surgery such as open heart surgery
- Patients, who had broken bones, sprains or bruises of the lower extremities.
- Patients who are in intravenous anti-hypertensive.

Description of the Tool:

Section A: Socio demographic variables.

This section consisted of 10 items for obtaining information about selected demographic variables such as gender, age, education status, occupation, economic status, marital status, dietary habits, body mass index, habits /addiction and exercise.

Section B: Clinical data

This section consisted of 5 items for obtaining information about selected clinical variables such as family history of hypertension, duration of hypertension, co-morbidities, use of antihypertensive, experienced side effects of anti-hypertensives, and use of alternative therapies for hypertension.

Section C: The vital parameters recording sheet

In this section assessment of vital parameters done by the investigator and charted in recording sheet. The observation and recording was done in the following manner:

Pulse: Pulse was measured by firmly but gently pressing the first and second fingertips against the wrist for one minute and recorded in the vital parameters recording sheet.

Respiratory rate: It was measured by the investigator, observing chest rising and falling in one minute was charted in the vital parameters recording sheet.

Blood pressure: Assessment of Blood pressure was done by the investigator using mercury sphygmomanometer. It was recorded by placing the patient in supine position and recorded in terms of millimeters of mercury (mm/Hg).

Section D: Vital parameters assessment sheet: In this section the recorded vital parameters were categorized.

Vitals	Category	Range
Pulse rate (beats/min)	<60	Bradycardia
	60 - 80	Normal
	81-100	High normal
	>100	Tachycardia
Respiration rate (breath/min)	<12	Bradypnea
	12 - 20	Normal
	>20	Tachypnea

Hypertension is classified according to JNC 8 classification **(Joint national committee on prevention, detection, evaluation and treatment of high blood pressure)[23].**

Classification of blood pressure:

Score	Systolic BP(mmHg)	Diastolic BP(mmHg)	Range
1	< 110	<70	Hypotension
2	110 139	70 89	Normal blood pressure
3	140 159	90 99	Mild blood pressure
4	160 179	100 109	Moderate blood pressure
5	>180	>110	Severe blood pressure

Assessment of blood pressure was done by the investigator using mercury sphygmomanometer and recorded in mmHg. Scores were given to each category of blood pressure values as 1, 2, 3,4, and 5 respectively

and then an average of three readings was taken out as the mean score.

Validity: The tool was submitted to 7 experts including 4 nursing personnel's from the field of Medical-Surgical Nursing and one consultant from cardiology department, one practitioner of foot reflexology along with the criteria checklist. The experts were requested to check for the relevance, sequence and language of the tool. Minor modifications were done according to expert's opinion and final tool was developed.

Reliability: The reliability of the blood pressure assessment tool was done by using test-retest method and 'r' value was computed by Karl Pearson's formula of co-relation was 1 for BP instrument i.e. mercury sphygmomanometer. Reliability of pulse rate and respiratory rate observations were done by test-retest method .The computed r value was 1 and it was found to be reliable.

Data Collection Procedure: Written permission was obtained from the administrative authority and research ethical committee of Choithram Hospital and Research Centre prior to the data collection. The actual data collection period was from 24[th]March 2015 to 10[th]May 2015. The procedure for data collection was divided into pre-procedure, procedure and follow- up.

Pre-procedure:

- Permission was taken from the hospital administrative authority and research ethical committee.

- Selected the samples as per the inclusion criteria of the study

- Procedure was explained &consent was taken from all samples.

Procedure:

- The participant was explained about the foot reflexology and informed consent was taken. A detailed history was taken by establishing good rapport.

- Before intervention 3 observations were made and the average of that was considered as pretest score to assess the vital parameters of the patients.

Pulse rate was measured by firmly but gently pressing the first and second fingertips against the wrist for one minute.

Respiratory rate was taken by observing chest rising and falling in one minute

Blood pressure was assessed by mercury sphygmomanometer measured at upper arm with patient in supine position.

After determining the values of vital parameters foot reflexology was administered for experimental group using fingers and jimni on reflex points of feet for a total of six sessions. Two sessions of the therapy administered each day whereby each session included 30 minutes of foot reflexology (15minutes on each foot).

Foot reflexology techniques included:

10 min relaxation technique (in each foot):

Relaxation techniques included certain manipulations and massage of the foot with hands in order to produce a feeling of relaxation in all over the body

Relaxation techniques:

1. Hold the bottom of the foot with both hands. Begin rubbing the top of the foot, slowly working your way down to the sole of the foot. Apply more pressure as you get closer to the sole.

2. Give pressure to areas between each finger from top to bottom.

3. Apply pressure on toes with hand from bottom to top. Gently twist in upward motion

4. Twist the feet gently using hands.

5. Use a fist to massage the arch of the foot. With your hand closed in a fist, use the tops of your fingers to apply pressure to the arch. Roll your hand back and forth to

knead the skin gently.

5 min stimulation of selected points

5 min stimulation of selected points corresponding to pituitary gland, heart, pineal gland, kidney and adrenal gland.

Points to be stimulated by applying gentle pressure with jimni on clockwise anti clock wise direction (an instrument using for applying pressure)

Each points to be stimulated for one minute.

After 6 sessions of intervention 3 observations were made and the average of that was considered as pretest score to assess the vital parameters of the patients.

Reflexology Chart Explaing about Reflexpoints Corresponding to Body Organs
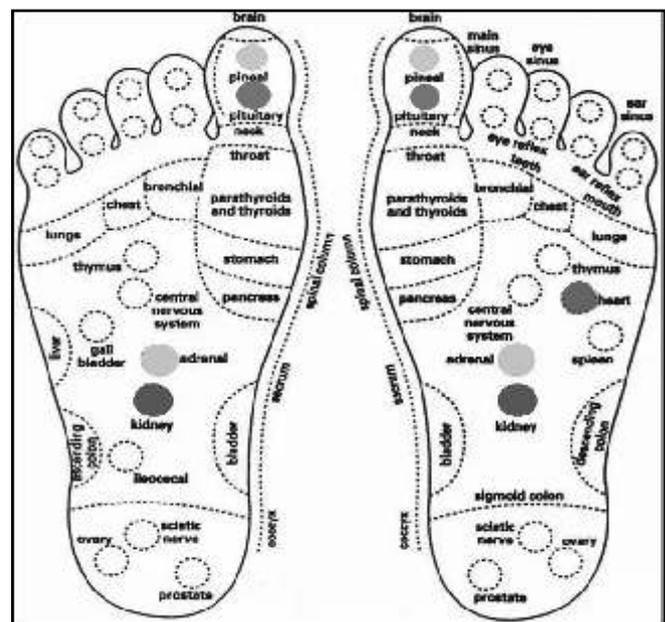
Note: The colored points in the figure represent pineal gland pituitary gland, heart, adrenal gland and kidney. Stimulation of this points helps in reduction of increased vital parameters in hypertensive patients

Follow up

The samples in the experimental group were explained and trained about the techniques of foot reflexology in order to reduce blood pressure. Researcher kept contact with all the patients and corrected their doubts over phone. Also, the control group patients were taught about foot reflexology.

Findings

Section I(a): Frequency and Percentage Distribution of Socio Demographic variables of Hypertensive Patients among Experimental and Control Group

It was found that male samples outnumbered the females in the present study. In experimental group 17(56.6%) of samples were males whereas 13(43.4%) were females. More than half of the participants in control group 18(60%) were males and 12(40%) were females. Distribution of subjects based on age shows that almost half of samples in experimental 14 (46.7%) and control group 12(40%) were within the age group of 35-50.

Majority of the samples in both experimental group 10(33.4%) and control group 11(36.6%) were secondary educated. Regarding the occupation, half of the samples in experimental (50%) and control group (46.7%) were self-employed. Regarding monthly income majority of the samples 10(33.3%) in the experimental group comes under Rs 16020-32049 /month category .But in the control group majority of the samples 13(43.3%) were having a monthly family income in between Rs 12020-16019/ month.

More than half of the samples in the experimental group 20(66.7%) and control group 22(73.3%) belonged to the upper middle category according to Kuppuswami socio economic class. The data concerning dietary pattern revealed that more than half of the subjects were vegetarians both in experimental 17(56.6%) and in control 18(60%) group

It was found that half of the samples in experimental group 15(50%), and almost half in the control group 12(40%) were overweight. Finding revealed that, 13(43.3%) of samples in experimental group and 11(36.6%) in control group were not addicted to any bad habits. Majority of the samples in the experimental group (56.6%) had the habit of daily walking. But majority of the samples in the control group 13(43.3%) were not doing any exercises.

Section I(b): Frequency and Percentage Distribution of Clinical Variables of Hypertensive Patients among Experimental and Control Group

Almost all the participants in experimental group 27(90%) and control group 28(93.3%) were having family history of hypertension. Data concerning the duration of hypertension revealed that, nearly half 14(46.7%) in experimental group and more than half 16(53.4) in control group were diagnosed of having hypertension between 5-10 years of duration. Data showed that diabetes is the top most co-morbidity both in experimental (46.7%) and in the control group (43.3%)

60% samples both in experimental and in control group had experienced headache as a side effect of anti-hypertensives. None of the participants in experimental and in control group were using any alternative therapies for the treatment of hypertension

Section II: Frequency and Percentage Distribution of Values of Vital Parameters of Hypertensive Patients among Experimental Group before and after intervention

Section II(a):Values of pulse rate (n_1=30)

Classification	Experimental group			
	Before Intervention		After intervention	
	f	%	f	%
Bradycardia	0	0	0	0
Normal	0	0	26	86.7
High normal	26	86.7	4	13.3
Tachycardia	4	13.3	0	0

Data presented in the above table shows that before intervention 26(86.7%) of the samples were having high normal pulse rate and 4(13.3%) were having tachycardia. After intervention the increased pulse rate was reduced and 26(86.7%) of the samples attained normal pulse rate and 4(13.3%) had high normal pulse rate.

Section II(b): Frequency and percentage distribution of values of respiratory rate among experimental group before and after intervention (n_1=30)

Classification	Experimental group			
	Before Intervention		After intervention	
	f	%	f	%
Bradypnea	0	0	0	0
Normal	8	26.6	29	96.7
Tachypnea	22	73.4	1	3.3

Data presented in this table shows that before

intervention 8(26.6%) of the samples were having normal respiratory rate and 22(73.4%) were having tachypnea. After intervention the increased respiratory rate was reduced and 29(96.7%) of the samples attained normal respiratory rate and 1(3.3%) were having tachypnea even after intervention.

Section II(c): Values of blood pressure among experimental group before and after intervention

Table No1: Frequency and percentage distribution of values of blood pressure among experimental group before and after intervention (n_1=30)

Classification	Experimental group			
	Before Intervention		After intervention	
	f	%	f	%
Hypotension	0	0	0	0
Normal BP	0	0	29	96.7
Mild HTN	10	33.3	1	3.3
Moderate HTN	13	43.4	0	0
Severe HTN	7	23.3	0	0

Data in Table No.1 reveals that majority of the patients in the experimental group had moderate hypertension 13 (43.4%), more than one fourth 10(33.3%) of the samples were suffering mild hypertension, and nearly one fourth of the samples7 (23.3%) were severe hypertensive. After administering foot reflexology for 3 days almost all patients 29(96.7%) achieved normal blood pressure level.

Section III: Effectiveness of Foot Reflexology on Values of Vital Parameters among Experimental Group

Table No. 2(a): Mean, mean difference, Standard deviation, Standard error, df and t value of pretest and post test score of values of pulse in experimental group (n_1=30)

Group	Mean	Mean diff	SD	SE	df	t value	Table value
Pre test score	99.06	22.6	7.4	1.35	29	16.7	2.05
Post test score	76.4					***S	

$p \leq 0.05$*, $p \leq 0.01$**, $p \leq 0.001$*** **S**=Significant   **NS**=Non Significant

It was depicted in Table No.2 that before intervention the mean score of pulse rate was 99.06 and after intervention the mean score was reduced down to 76.4. The mean difference was 22.6 for t-value to be 16.7 which was statistically significant at the level $p \leq 0.001$.

Table No. 2(b): Mean, mean difference, Standard deviation, Standard error, df and t value of pretest and post test score of values of respiratory rate in experimental group (n_1=30)

Group	Mean	Mean diff	SD	SE	df	t value	Table value
Pretest score	23.02	5.6	3.38	0.61	29	9.07	2.05
Post-test Score	17.4					S	

$p \leq 0.05$*, $p \leq 0.01$**, $p \leq 0.001$*** **S**=Significant   **NS**=Non Significant

Data in Table No. 2(b) reveals that before intervention the mean score of respiratory rate was 23.02 whereas after intervention the observed mean score of respiratory rate was 17.4.There was a significant reduction in respiratory rate with a mean difference of 5.6 and t value 9.07which was found to be statistically significant at $p \leq 0.001$.

Table No. 2(c): Mean, mean difference, Standard deviation, Standard error, df and t value of pretest and post test score of values of blood pressure in experimental group (n_1=30)

Group	Mean	Mean diff	SD	SE	df	t value	Table value
Pretest Score	3.71	1.68	0.78	0.14	29	12	2.05
Post-test score	2.03					S	

$p \leq 0.05$*, $p \leq 0.01$**, $p \leq 0.001$***   **S**=Significant

Data in Table No. 2(c) reveals that before intervention the mean score of blood pressure was 3.71 which was

reduced to 2.03 after intervention. The mean difference was 1.68. Therefore it is found that the reduction is statistically significant for t-value 12 at the level $p \leq 0.001$.

Section IV: Comparison of Post Test Score of Values of Vital Parameters among Experimental and Control Group

Table No. III(a): Mean, mean difference, Standard deviation, Standard error, df and t value of post test score of values of pulse rate between experimental group and control group $(n_1=30, n_2=30)$

Group	Mean	Mean diff	SD	SE	df	t value	Table value
Experi mental	76.4	12.2	21.3	5.1	58	2.3*	2
Control group	88.6					S	

$p \leq 0.05$*, $p \leq 0.01$**, $p \leq 0.001$*** S=Significant **NS**=Non Significant

Data depicted in Table No.3 that the mean post test score of values of pulse rate was 76.4 in experimental and 88.2 in control group, the computed t value was 2.3 at df 58 with SD of 21.3.This indicated that that there was a significant difference between post test score of values of pulse rate between experimental and control group at the level $p \leq 0.001$.

Table No. III(b): Mean, mean difference, Standard deviation, Standard error, df and t value of post test score of values of respiratory rate between experimental group and control group

$(n_1=30, n_2=30)$

Group	Mean	Mean diff	SD	SE	df	t value	Table value
Experi Mental	17.4	5.66	1.6	0.29	58	19.5	2
Control group	23.06					*** S	

$p \leq 0.05$*, $p \leq 0.01$**, $p \leq 0.001$*** **S**=Significant

NS=Non Significant

Analysis revealed that in Table No. III(b) the mean post-test score of values of respiratory rate was 17.4 in experimental and 23.06 in control group, the computed t value was 19.5 at df 58 with SD of 1.6.This indicated that that there was significant difference between post test score of values of respiratory rate between experimental and control group at the level $p \leq 0.001$.

Table No.III(c): Mean, mean difference, Standard deviation, Standard error, df and t value of post test score of values of blood pressure between experimental group and control group

$(n_1=30, n_2=30)$

Group	Mean	Mean diff	SD	SE	df	t value	Table value
Experi mental	2.03	1.57	0.64	0.15	58	10.5***	2
Control group	3.6					S	

$p \leq 0.05$*, $p \leq 0.01$**, $p \leq 0.005$*** **S**=Significant **NS**=Non Significant

Data depicted that in Table No.III (c) the mean post score of values of blood pressure was 2.03 in experimental and 3.6 in control group, the computed t value was 10.5 at df 58 with SD of 0.64. This indicated that that there was significant difference between post test score of values of blood pressure between experimental and control group at the level $p \leq 0.001$.

Section IV(a): Association between severity of hypertension and selected pre-interventional socio-demographic variables:

Data revealed that significant association was found only for selected variables that is between severity of hypertension and habits or addiction (df=6, $X^2=31.3$) and habit of daily walking (df=6, $X^2=25.6$) which were found to be highly significant at the level $p \leq 0.001$.

Section IV(b): Association between severity of hypertension and selected pre-interventional clinical variables:

There was significant association found between severity of hypertension and selected co-morbidities (df=8, X^2=16.6) and duration of hypertension (df=6, X^2=16.1) at the level $p \leq 0.01$.

Discussion

Effectiveness of foot reflexology in vital parameters among experimental group

After administering foot reflexology for 6 sessions it was found that there was marked decrease in values of all three vital parameters i.e. pulse, respiration and blood pressure among experimental group of hypertensive patients. The mean difference in pulse rate among pretest score and post test score was 22.6. This test result showed that it was highly significant at the level $p \leq 0.001$. In the case of respiratory rate the calculated mean difference was 5.6 and it was found to be significant at $p \leq 0.005$. The mean difference in blood pressure scores was found that 1.68 and this was also found to be highly significant at the level of $p \leq 0.001$.

The above findings were supported by the study conducted by Jasvir Kaur [15] that revealed effectiveness of foot reflexology on physiological parameters of chronically ill patients admitted in ICU and CCU. This study results showed that after 6 sessions of foot reflexology there was marked decrease in physiological parameters i.e. pulse, respiration and blood pressure at the level $p \leq 0.05$ among experimental group of hypertensive patients. But in control group patients, who were on oral anti-hypertensive medications there was no significant reduction observed.

Conclusion

Hypertension is the most post prevalent non-communicable disease and the major health problem in the world. Increasing blood pressure slowly causes serious organ damage putting the patient at risk of sudden death from stroke or heart disease. Amidst the various treatment modalities to combat hypertension alternative therapies like foot reflexology is gaining recognition, owing to its advantage of cost effective and free of any adverse effects.

After the successful completion of the statistical evaluation, the investigator found that with the application of foot reflexology, there is significant reduction in all the vital parameters ie pulse rate, respiratory rate and blood pressure.

While concluding the present study the researcher had a good learning experience, enriched with life experience of patients suffering from chronic illnesses. The findings can be put into evidence based practice in future. Care should always change with new discoveries and innovations. When nurses integrate the science and art of nursing into their practice, the quality of care provided to the patients is at a level of excellence that benefits in innumerable ways

Fool reflexology and foot massage increases the bonding between people. One of the study participant's sons shared the view that "It is a great way of showing someone how much you appreciate for all the hard work that she (his mother) has done for us. In India in joint families children used to press and massage the elder's feet. Foot reflexology is similar to that tradition. it is also a way of bringing two people closer together. It provides blessings and nourishes Indian culture.

Conflict of Interest: None

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