

Research Article

Effectiveness of Foot Massage and Mitchell's Relaxation Technique on Physiological and Psychological Parameters of Patients Undergoing Elective Angioplasty

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ABSTRACT

Aim: The aim of the study is to evaluate the effectiveness of foot massage and Mitchell's relaxation technique on physiological and psychological outcome of patients undergoing elective angioplasty. **Background:** The physiological parameters of patients will be altered due to stress. Use of alternative therapies is needed to improve health and considered as therapeutic perquisites. Foot massage and Mitchell's relaxation technique would reduce stress, blood pressure (BP), heart rate (HR), and respiratory rate and have certain health benefits. **Methods:** Quasi-experimental study with two group pre-test and post-test design was adopted with purposive sampling on 30 study participants who have fulfilled the inclusion criteria and randomly allotted into two groups. Group 1 for foot massage and Group 2 for Mitchell's relaxation technique for 3 days at morning 7 AM and evening 7 PM. Socio-demographic and clinical profile datasheet and stress rating scale were used to collect the data. After giving six interventions, on 3rd-day post-test was done. **Results:** Both Mitchell's relaxation technique and foot massage were effective in lowering physiological and psychological parameters. HR, BP, and stress level of patients who had massage and BP and stress level for those had Mitchell's relaxation were statistically significant at 0.05 levels ($P < 0.05$). Age of the patient was significantly associated with HR. Exercise and personal habits had a significant association with pre-test stress score at 0.05 levels ($P < 0.05$). **Conclusion:** Foot massage is found to be more effective in reducing BP, HR, and stress level than Mitchell's relaxation technique in patients undergoing elective angioplasty. As a regular nursing intervention, these therapies can be incorporated.

Keywords: Blood Pressure, Coronary artery disease, Foot massage, Heart Rate, Mitchell's relaxation technique, Respiratory Rate

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Introduction

Coronary artery disease (CAD) is the leading cause of death in worldwide. CAD is an identifiable common underlying

pathophysiological process of atherosclerotic disease. Primary prevention measures such as diet and drug would lower CAD.^[1] Studies beginning of 1930 show that increased CAD is due to industrialization and influence of developed nations. Many researches have consistently shown that depression is a risk factor contributing to development and complication of CAD.^[2] In India, an increase in CHD prevalence was reported over past 60 years, from 1% to 9–10% in urban populations and <1 % to 4–6% in rural populations. The prevalence varies from 15 to 25% in rural population and 2 to 4% in urban populations using strict measuring criteria. This is considered a realistic prevalence of CHD in India.^[3]

Over the past 20 years, percutaneous transluminal coronary angioplasty, bare-metal stents, and drug-eluting

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stents are the catheter-based treatments for CAD.^[4] Environmental and psychological factors are responsible for decreased sleep quality in patients at coronary care unit (CCU).^[5] The intervention of bath and massage on foot has a synergistic effect when used in combination and is effective in inducing sleep. This complementary care method can be recommended to be implemented by CCU nurse.

Nervous system imbalance is corrected by initiating relaxation response and significantly reduces heart rate (HR). Production of cortisol hormone has a widespread effect on the cardiorespiratory system. Many studies show that foot massage and Mitchell's relaxation technique are very useful in reducing stress and HR, blood pressure (BP), and respiratory rate (RR) of patients with CAD.

Care and concern of human being are highly technical in the fast-moving modern Hi-Technology world. Nowadays, all fields have adopted modern technologies even the nursing profession are utilizing such technologies in providing care to the client. All are forgetting that touch has therapeutic values in providing nursing care. It is necessary to use touch along with Hi-Technology as means of independent nursing intervention. Complementary therapies are nontraditional intervention used for promoting health.

Nurse can add complementary therapies in the nursing practice as an alternative response to consumer needs and changes in health care. Foot reflexology and Mitchell's technique have been used in alleviating anxiety and stabilizing hemodynamic and psychological status among different patient population.^[6] In the world, all are doing standing, running, walking, and lifting and feet is supporting the entire way of these activities. Foot massage helps to reduce BP and physiological parameters such as HR, RR, and stress levels also.

Foot massage is important in many cultures. In India, foot massage has been an integral part of defining the core of relationships for many years. Foot massage is used to treat issues such as headache, insomnia, and stress. The procedure of foot massage begins from tops of feet to the heels, soles, toes, and deeply moving on the ankles. Massaging the pressure points to release tension and create a positive massage experience for the individual.

Massaging on the pressure points improve the functions of the internal organ and reduces the physiological parameters. This technique focuses on relaxing the muscles and joints. When the foot is massaged, it brings energy to the body. Foot massage releases blocks of energy and allows free-flowing of energy through the body.

Laura Mitchell's relaxation technique is stretching and relaxing of all muscle groups in the body one by one. Tightening of muscles followed by relaxation helps in releasing tension within the muscles. When the individual is awake, through the kinesthetic sensation, the brain will register change in body position. This will help the individuals to identify parts of the body

that seems to contain most tension and parts that feel the most relief from. Once individuals are familiar with these techniques, just "scan" the body for the points of tension and focus on those points to make the patients feel more relaxed.^[7]

Objectives

The objectives are as follows:

1. Assess the effectiveness of foot massage and Mitchell's relaxation technique on physiological and psychological parameters of patients undergoing elective angioplasty.
2. Compare the effect of foot massage and Mitchell's relaxation technique on physiological and psychological parameters of patients undergoing elective angioplasty.
3. Find the association of selected demographic variable with physiological and psychological parameters of patients undergoing elective angioplasty.

The theoretical framework for the present study is based on Imogene King's goal attainment model (1989).

Setting of the study

This study was conducted at Aster MIMS Hospital Kozhikode.

Sample

A total of 30 patients undergoing elective angioplasty.

Socio-demographic and clinical profile

The socio-demographic and clinical profile include age, gender, religion, marital status, education, occupation, type of family, breadwinner of the family, family history of cardiovascular disease, diet habit, history of cardiac surgery, history of taking cardiac medications, and habit of exercise. Stress assessment was done using numerical rating scale and had 20 self-reported questions. The techniques used were observation and self-report.

The reliability of the rating scale for stress was assessed by split half method. Reliability was 0.7 and content validity index was 0.93, respectively.

Sampling technique

Purposive sampling technique with 30 patients who are undergoing elective angioplasty in Aster Mims Hospital was selected and randomly assigned into Group 1 for foot massage and Group 2 Mitchell's relaxation technique.

After getting the approval of the Institutional Ethical Committee, permission was obtained from the authorities concerned. The data collection period was from January 16, 2019, to January 30, 2019. The patient

information sheet was given to each study participant. After getting their consent socio-demographic and clinical data were collected with help of a semi-structured interview. Exercise and benefits of exercises were taught to patient. Physiological (HR, BP, RR) and psychological (Stress) parameters were measured before the intervention. After that administered intervention to both groups separately. The same procedure was repeated in the evening after 12 h interval. Continued procedure for 3 days, on 3rd-day post-test was done with the same tool for psychological and psychological parameters assessment.

Results

In socio-demographic profile majority of sample (46%) between the age group of 60 and 74 years, and 83.33% were male, 60% of have primary education, 100% of were married, and 70% of were Hindu.

Clinical profile shows that majority of study participants 56% were diabetic, 40% were hypertensive, 56.66% had no family history of cardiovascular disease, 40% were having habits such as alcoholism and smoking, 66.66% had no habit of doing exercise, 56.66% were doing daily walking, 70% were nonvegetarian, 96.66% had no history of heart surgery, and 63.33% have no history of taking any cardiac medications.

In the group of foot massage, 73.33% of patients had HR between 80 and 89 beats/min and 6.66% of patients had HR between 100 and 109 beats/min, 53.33% of patients had systolic BP between 130 and 139 mmHg, and 6.66% of patients had systolic BP between 150 and 159 mmHg. A majority of patients (53.33%) had diastolic BP between 80 and 89 mmHg, and 13.33% of patients had diastolic BP between 70 and 79 mmHg, and 80% had RR between 16 and 25 breath/min and 20% had 26 and 35 breath/min. Around 53.33% of patients had moderate stress level and 46.66% of patients had severe stress before intervention.

In the group of Mitchell’s relaxation technique, 93.33% of patients had HR between 80 and 89 beats/min and 6.66% of patients had HR between 70 and 79 beats/min; 47% had systolic BP between 130 and 139 mmHg and 20% had systolic BP between 150 and 159 mmHg; 80% had diastolic BP between the range of 80 and 89mmHg and 13.33% had

diastolic BP between 90 and 99mmHg; 93.33% had RR between 16 and 25 breath/min and 6.66% had RR between 26 and 35 breath/min; and 93.33% had severe stress and 6.66% had moderate stress.

Table 1 shows that the mean difference of pre-test and post-test HR was 14.13 with $t = 12.33$, and $P = 0.00$ ($P < 0.05$). The mean difference between pre-test and post-test systolic BP was 20.66 with $t = 8.36$, and $P = 0.00$ ($P < 0.05$). The pre-test and post-test mean score of diastolic BP was 23.13, with $t = 11.69$ and $P = 0.00$ ($P < 0.05$). The mean pre-test and post-test mean score of respiration was 1.33 with $t = 2.00$ and $P = 0.65$ ($P > 0.05$). The mean pre-test and post-test mean score of stress was 3.20 with $t = 12.61$, and $P = 0.00$ ($P < 0.05$). Foot massage was effective in reducing HR, BP, and stress level of patients undergoing elective angioplasty. Figure 1 shows that 46.66% of patients had severe and 53.33% of patients had moderate stress before intervention. After intervention, 33.33% of patients had no stress and 66.66% patients had mild stress. A significant reduction in stress after the intervention, as t -value is 12.61 and $P = 0.00$ ($P < 0.05$) with mean difference of 31. This result shows that foot massage was effective in reducing stress of patients undergoing elective angioplasty. Hence, we reject the null hypothesis.

Table 2 shows the paired t -test result with t -value of systolic BP -2.70 and with $P = 0.017$ ($P < 0.05$) and $t = 2.39$ with $P = 0.031$ ($P < 0.05$) for stress scores after the intervention. This result showed that Mitchell’s relaxation technique was effective in reduction of BP and stress level of patients undergoing elective angioplasty, so partially reject the null hypothesis.

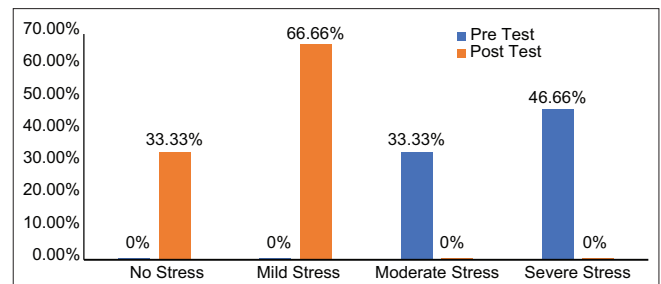


Figure 1: Effectiveness of foot massage on stress scores of patients undergoing elective angioplasty

Table 1: Effectiveness of foot massage on physiological and psychological parameters of patients undergoing elective angioplasty after the intervention $n=15$

Variable	Pre-test Mean±SD	Post-test Mean±SD	Mean difference	t value	df.	P value
Heart rate	81.86±3.81	67.73±5.70	14.13	12.33	14	0.00**
SBP	132.66±7.89	112.0±7.03	20.66	8.36	14	0.00**
DBP	82.13±6.73	59.0±20.0	23.13	11.69	14	0.00**
RR	19.46±1.59	18.13±1.76	1.33	2.00	14	0.65
Stress	45.00±8.60	17.00±4.17	31.0	12.61	14	0.00**

SD: Standard deviation. (* $P < 0.05$ level of significance, ** $P < 0.01$ level of significance). BP: Blood pressure, RR: Respiratory rate, SBP: Systolic blood pressure, DBP: Diastolic blood pressure

Compare the effect of foot massage and Mitchell’s relaxation technique on physiological and psychological parameters of patients undergoing elective angioplasty

Table 3 shows the independent *t*-test result that there is reduction of HR after the intervention for both groups as $t = 8.85$ and $P = 0.01$ ($P < 0.05$) and mean score of foot massage was 14.13 and Mitchell’s relaxation was -6.53 . The systolic BP in both groups was with $t = 8.014$ and $P = 0.01$ ($P < 0.05$). Mean score of foot massage is 20.00 and Mitchell’s relaxation is -5.86 and a significant reduction of stress scores after the intervention. There is reduction in diastolic BP in foot massage and Mitchell’s relaxation technique with $t = 8.61$ and $P = 0.01$ ($P < 0.05$), mean score of foot massage was 22.93 and Mitchell’s relaxation was -3.46 . There is reduction of stress in foot massage and Mitchell’s relaxation technique with $t = 9.58$, with $P = 0.01$ ($P < 0.05$), mean score of foot massage was 28.06 and Mitchell’s relaxation was 3.2. Result showed that both foot massage and Mitchell’s relaxation technique were effective in reducing physiological and psychological parameters of patients, foot massage was more effective than Mitchell’s relaxation technique in patients undergoing elective angioplasty.

Find the association of selected demographic variable with physiological and psychological parameters of patients undergoing elective angioplasty

Age was associated with HR as the $P = 0.46$ ($P < 0.05$) and there is significant association between age with HR.

P value of habit is 0.014 ($P < 0.05$), and P value of type of exercise is 0.04 ($P < 0.05$). There is association between exercise and habits with stress score. Hence, we reject the null hypothesis.

Discussion

The findings of the present study showed that 83.33% of them were male. About 46% of the sample belongs to age group of 60–74 years. There was only 43.33% that sample had family history of cardiovascular disease. A similar study was conducted by Cripps *et al.* to find the demographic and clinical characteristics of patients with stable CAD which shows that majority of the sample were men (81%) with a mean age of 65 years. It showed that there was a higher frequency rate of family history of CAD.^[5] As the age increases, the risk for cardiovascular disease also increases. Genetic reasons are the cause for familiar occurrences of cardiac disease. This study finding also supports it.

The present study result shows that foot massage and Mitchell’s relaxation technique were effective in reducing physiological and psychological parameters of patients and statistically significant at 0.05 levels. Stress is reduced with interventions of foot massage and Mitchell’s relaxation technique and in turn found reduction in HR and BP. Nurses could use these both interventions in their clinical practice as on regular basis to reduce stress and its consequences. This would be considered as a cost-effective measure in clinical settings.

Similar study conducted by Victoria *et al.* to assess the effectiveness of Mitchell’s relaxation technique and

Table 2: Effectiveness of Mitchell’s relaxation technique on physiological and psychological parameters of patients undergoing elective angioplasty $n=15$

Variable	Pre-test	Post-test	Mean difference	<i>t</i> value	df.	<i>P</i> value
	Mean±SD	Mean±SD				
Heart rate	81.0±3.69	87.0±6.37	6.00	-3.25	14	0.06
SBP	137.0±7.89	143.0±4.70	7.00	-2.70	14	0.017**
DBP	80.66±4.57	84.13±7.50	3.47	-1.47	14	1.63
RR	23.06±15.77	17.73±1.66	5.33	1.30	14	0.212
Stress	53.00±5.10	49.80±2.73	3.2	2.39	14	0.031*

(* $P < 0.05$ level of significance, ** $P < 0.01$ level of significance). BP: Blood pressure, RR: Respiratory rate, SBP: Systolic blood pressure, DBP: Diastolic blood pressure, SD: Standard deviation

Table 3: Comparison of foot massage and Mitchell’s relaxation technique on the physiological and psychological parameter of patients undergoing elective angioplasty $n=30$

Variable	Foot massage	Mitchell’s relaxation	<i>t</i> value	df	<i>P</i> value
	Mean±SD	Mean±SD			
Heart rate	14.13±4.43	-6.53 ± 7.76	8.85	15	0.01**
SBP	20.00±9.25	-5.86 ± 8.39	8.014	15	0.01**
DBP	22.93±7.59	-3.46 ± 9.11	8.61	15	0.01**
RR	1.33±2.58	5.33±15.77	-0.96	15	0.341
Stress	28.06±8.61	3.20 ± 5.17	9.58	15	0.01**

(* $P < 0.05$ level of significance, ** $P < 0.01$ level of significance). BP: Blood pressure, RR: Respiratory rate, SBP: Systolic blood pressure, DBP: Diastolic blood pressure, SD: Standard deviation

Jacobson's relaxation technique. There were significant reductions in systolic BP and HR with $P = 0.001$ and diastolic BP and respiration with $P = 0.001$ which was significant at 0.05 level. The study showed that after administering the interventions were significant in reducing systolic BP and HR in both interventions.^[8] Unfamiliar environment and procedures may increase the stress, HR, and BP. Patients who are posted for elective angioplasty will be facing the same situation. Simple and cost-effective procedures would help patients and their family members. Nurses have an important role in management of patients with stress and control of physiological parameters of patients undergoing elective angioplasty. Different types of exercises have beneficial effect on physiological and psychological parameters (stress). The present study revealed that foot massage and Mitchell's relaxation techniques are useful.

Strength and limitation

This study evaluated the physiological parameters in the body (HR, BP, and RR) and psychological parameters (stress) due to impaired health status of patients undergoing elective angioplasty.

Limitation of the present

The study was generalizations of the findings that are limited due to small sample size, and the intervention was limited for 3 days (six interventions).

Conclusion

Foot massage and Mitchell's relaxation techniques would help to relieve the stress of patients with elective angioplasty, and in turn it reduces the HR and BP. The findings of the study show that foot massage had more significantly reduced stress, HR, and BP. The foot massage can be included as a regular nursing intervention in controlling physiological and psychological parameters of patients undergoing elective angioplasty.

Nursing implication

During the clinical practice, nurses can teach foot massage to the patients' relatives. Teaching foot massage is less expensive when compared to other therapies. The findings can be utilized by the nurse educators while conducting staff development program. Nurse administrators can utilize the study findings in developing policies regarding the implementation of such exercise in the hospital. They should

organize in service education and training program on stress management. The nurse researcher can participate in the dissemination meetings and can disseminate the findings of research for future use.

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Conflicts of Interest

Authors have no conflicts of interest.

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