

Effectiveness of Bitter Apple Oil (*Citrullus colocynthis*) Versus Coconut Oil Foot Massage on Neuropathic Pain among Patients with Diabetes Mellitus at Selected Rural Area, Puducherry

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ABSTRACT

BACKGROUND: Diabetes Mellitus is one of the non-communicable diseases which are one of the leading causes for increased morbidity. A study from south East Asia states that most common micro vascular complication of diabetes mellitus is diabetic peripheral neuropathy. Nearly 50-90% of people with diabetes mellitus report to have diabetic peripheral neuropathy. The pain associated with diabetic peripheral neuropathy is also on the rise. This is the most common reason for the diabetic mellitus population to seek the health care facilities. The present study was aimed to determine the efficacy of bitter apple oil foot massage vs coconut oil foot massage on reducing neuropathic pain.

MATERIALS AND METHOD: Randomized controlled trial design was adopted. 90 samples were assigned using Simple random sampling technique. Group I received bitter apple oil foot massage and Group II received coconut oil foot massage for a period of one month. Data was analyzed by descriptive and inferential statistics.

RESULT: The study findings revealed that bitter apple oil foot massage was effective to reduce neuropathic pain ($p < 0.001$) than coconut oil foot massage

CONCLUSION: Diabetic neuropathy pain is the important need of patient with Diabetes Mellitus which needs to be intervened by a nurse. The bitter apple oil foot massage is a boon to alleviate the pain of the suffering diabetic population. This study proves that bitter apple oil foot massage was effective than coconut oil on reducing the neuropathic pain.

Key Term: Neuropathic pain, Bitter apple oil, Foot massage, Coconut oil. Diabetes mellitus

INTRODUCTION

Diabetes mellitus is one of the non-communicable diseases which are one of the leading causes for increased morbidity. It is estimated that more than 62 million Indians, are living with diabetes mellitus as per the report of World Health Organization.^[1] Peripheral neuropathy is one of the most common micro vascular complication for both type 1 and type 2 diabetes mellitus. A

study from South East Asia states that most common micro vascular complication of diabetes mellitus is diabetic peripheral neuropathy. Nearly 50-90 % of people with diabetes mellitus report to have diabetic peripheral neuropathy.^[2]

Diabetic neuropathy is a type of nerve damage that can occur with high blood sugar causing injury to the nerves

throughout the body. Diabetic neuropathy most often damage nerves in legs and feet.^[3] A recent study was conducted by the prevalence of neuropathic pain and its qualities. Among the 100 diabetes mellitus people reports that (32.3%) had numbness, (29.7%) had pain with walking and (29.7%) had loss of sensation in leg/feet.^[4]

Diabetic neuropathy pain can have a serious impact on the quality of life of the patients. The study finding implicates that 20.3 % of the people diagnosed have a poor quality of sleep, anxiety and depression.^[5] The available pharmacological management for pain are usually insufficient and uncertain on its effects. The commonly used group of drugs are Non-steroidal anti-inflammatory drugs and analgesics which increases further the cost of health care.^[6]

Hence people seek CAM as the best treatment option for neuropathic pain. This is supported by WHO in which 80% people living in complementary and alternative medicine.^[7]

This is supported by another study conducted by the natural compounds in the management of diabetic peripheral neuropathy which reveals that natural compounds are greatly used for diabetic peripheral neuropathy pain. The predominately used CAM therapies where acupuncture, electrotherapy, oriental Chinese medicine and herbal remedies.^[6] Bitter apple oil is one of the complementary and alternative medicine which can be used to pain relief as it has anesthetic antioxidant properties.^[8]

STATEMENT OF THE PROBLEM:

“Effectiveness of bitter apple oil (*Citrullus colocynthis*) versus coconut oil foot massage on neuropathic pain, among patients with diabetes mellitus at selected rural area, Puducherry”.

OBJECTIVES OF THE STUDY:

- To assess the existing level of Neuropathic pain among patients with diabetes mellitus in Group-I and Group-II.

- To evaluate the effectiveness of bitter apple oil (Group-I) and coconut oil (Group-II) foot massage on neuropathic pain among patients with diabetes mellitus.
- To find out the association between the level of pain, and selected demographic variables.

HYPOTHESIS:

H₁: There is a difference in the level of Neuropathic pain among patients with diabetes mellitus in group- I and group-II before and after bitter apple oil foot massage vs. coconut oil foot massage

H₂: There is a difference in the bitter apple oil foot massage than the coconut oil foot massage on neuropathic pain among patient with diabetes mellitus.

H₃: There is an association between neuropathic pain, and selected demographic variables.

MATERIALS AND METHODS

The research design adopted for the study was Randomized controlled trial. The study population consisted of people with diabetes mellitus who had experienced a diabetic neuropathic pain. The people were randomly assigned into the Group -1 and Group-2. The samples were selected based on the inclusion and exclusion criteria. The sample size was calculated based on the power analysis at the power of 90%.

The institutional Human ethical approval was obtained. The informed consent was obtained from the participants. A structured interview was used to collect the demographic variables and observational checklist to assess the level of neuropathic pain by using modified Douleur neuropathy pain scale. The pilot study was conducted to assess the tool reliability. In this study the researcher used Modified Douleur neuropathy pain scale. It is a modified standard scale and the reliability value was $r = 0.908$. The data collection was done for a period of 6 weeks.

After self-introduction by researcher a pretest was done to assess the level of neuropathic pain in both groups. Group I

received bitter apple oil foot massage and Group II received coconut oil foot massage for 15- 20 min twice a day for the period of one month. On the last day the post test was carried out for both Groups.

STATISTICAL ANALYSIS:

The data analysis was done using SPSS software 16 epidata version 2.2.2.186. The investigator used Descriptive statistics, such as number, percentage, mean, and standard deviation, were used to present the descriptive characteristics of the patients with diabetes mellitus in both groups. Inferential statistics such as Mann Whitney test was used to compare the effectiveness between the group I and Group 2. Wilcoxon test was used to find out the effectiveness of pretest and posttest within the group. Kruskal test was used to find out the association between the level of neuropathic pain and demographic variables.

RESULT

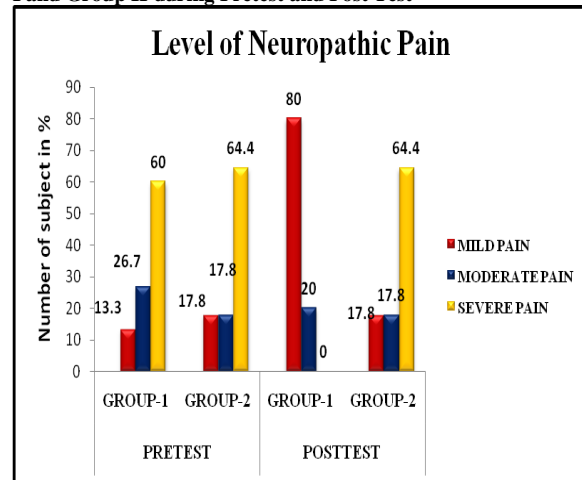
The following results were obtained when the data were collected from the patients.

Socio demographic Variables:

Among 90 samples 35(38.9%) were in the age group of 20-40 years. 38(42.2%) belong to the age group of 41-60 years. Near 17(18.9%) were above 60 years. with regard to the frequency of duration of diabetes mellitus 10(11.1%) were <1 year, 67(74.4%) were 1-10 years, 10(11.1%) were

more than 10 years and 3(3.3%) were none of diabetes mellitus, with regard to the frequency of hospitalization due to diabetes mellitus during last year 16(17.8%) were not hospitalized, 20(22.2%) were one time, 15(16.7%) were two time 16(17.8%) were three time and 23(25.6%) were four times and above.

Figure 1: Distribution of Level of Neuropathic Pain in Group I and Group II during Pretest and Post Test



Present study finding reveals that 27(60.0%) in Group I and 29(64.40%) in Group II had severe pain prior to the intervention. Whereas after the intervention the severity of pain reduced from severe to mild 36(80.0%) in Group I. 29(64.4%) in Group II continued to have severe pain.(Figure1).

Table 1: Comparison of Pre and Posttest of Mean Neuropathic Pain Level between Group I and Group II among patients with diabetes mellitus.

Observation	Group	Mean	Median	Standard deviation	Mann Whitney test	P-value
Pretest	Group-1	9.8	11	3	877	0.269
	Group-2	10.2	11	3.552		
Post test	Group-1	4.244	4	1.667	198.5	<0.01
	Group-2	10.24	12	3.492		

The table depicts that pretest mean neuropathic pain level in Group I and Group II was 9.8 and 10.2 respectively. The posttest mean neuropathic pain level in Group I and Group II was 4.244 and 10.24. p value was <0.01 in posttest which is significant at p<0.001, which implies that bitter apple oil foot massage was effective than coconut oil foot massage.

Table 2 : The association between level of neuropathic pain and demographic variables.

S.NO	DEMOGRAPHIC VARIABLES	GROUP				Chi-square	p-value
		NO	MEAN	MEDIAN	SD		
1.	Age in year					8.6511 df=2	0.0132 HS
	20-40	35	10.97	12	2.99		
	41-60	38	8.95	8	3.5		
	above 60	17	10.35	12	3.55		

The table depicts that the demographic variable age in year had shown statistically significant association with level of neuropathic pain $p < 0.02$. The other demographic variables had not shown statistically significant association with level of neuropathic pain.

DISCUSSION

The first objective of the present study finding reveals that 27(60.0%) in Group I and 29(64.40%) in Group II had severe pain prior to the intervention. Whereas after the intervention the severity of pain reduced from severe to mild 36(80.0%) in Group I. 29(64.4%) in Group II continued to have severe pain.

Finding is consistent with similar study done by Heydari Mojtaba, et.al., (2014) on effectiveness of bitter apple oil foot massage on neuropathic pain among patients with diabetes mellitus, where she tested out the effectiveness of bitter apple oil foot massage and found reduction in the level of neuropathic pain $p < 0.001$.^[9]

The second objective of the present study finding reveals that pretest mean neuropathic pain level in Group I and Group II was 9.8 and 10.2 respectively. The posttest mean neuropathic pain level in Group I and Group II was 4.244 and 10.24. p value was < 0.01 in Group I which is significant at $p < 0.001$, which implies that bitter apple oil foot massage was effective than coconut oil foot massage.

The third objective of the present study finding reveals that demographic variable age in year had shown statistically significant association with level of neuropathic pain $p < 0.02$. The other demographic variables had not shown statistically significant association with level of neuropathic pain.

Findings are consistent with similar study done by Kjersti Mørkrid et al (2010). The overall DPN prevalence was Age > 60 years, were independent, significant risk factors. Longer duration of diabetes, and higher HbA1c) were marginally

independent, significant risk factors for DPN. $p < 0.001$.^[10]

CONCLUSION

Diabetes mellitus is one of the most common chronic diseases across the world and number of diabetic patients is on the rise. Peripheral neuropathy is one of the most common micro vascular complications of diabetes mellitus. It also affects the quality of sleep, pain and general well beings. The study implicates that bitter apple massage will be very useful of patients with diabetic peripheral neuropathy pain. Bitter apple oil massage is a new cost effective approach to provide better pain relief.

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