

Comparative Study on Effectiveness of Peppermint Oil and Hot Fomentation For Joint Pain among Sickle Cell Anemia Patients

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Abstract

Introduction: Sickle cell anemia may cause pain such as stiffness of the joint, bone pain, muscle weakness, chest or abdominal pain. It is often not recommended to use over-the-counter painkillers (such as ibuprofen, morphine, advil, or aleve) because they can adversely affect the function of the kidney and/or liver. Try to use hot compresses for about 15 minutes up to 2-3 times per day to treat pain spontaneously. Beyond healing irritated skin, increasing endurance and encouraging relaxing, herbs are always an effective way to manage pain. It is possible to apply peppermint essential oil on the skin to decrease muscle sore or joint pain¹.

Objectives:-

1. To assess the level of joint pain among sickle cell anemia patients.
2. To assess the effectiveness of peppermint oil for joint pain among sickle cell anemia patients.
3. To assess the effectiveness of hot fomentation for joint pain among sickle cell anemia patients.
4. To compare the effectiveness of peppermint oil and hot fomentation for joint pain among sickle cell anemia patients.
5. To associate the effectiveness of peppermint oil for joint pain among sickle cell anemia patients with their selected demographic variables.
6. To associate the effectiveness of hot fomentation for joint pain among sickle cell anemia patients with their selected demographic variables.

Material and Methods: For this research, true experimental pre-test post-test research design has been adopted. The study was conducted in selected area of Wardha district. Simple random sampling technique was used to select 60 participants and 30 were recruited for each group. To evaluate joint pain, the tool used for data collection was a scale of (0-10 scale of pain severity) pain scale. Both each group was given peppermint oil and hot fomentation for seven days for three times a day.

Result:- The after intervention mean score of hot fomentation 2.90 ± 0.71 was higher than that of peppermint oil 1.53 ± 0.68 and the calculated 't' value 7.59 was significant at $p < 0.0001$.

Conclusion:- The study proved that peppermint oil was effective than the hot fomentation for reduction of joint pain among sickle cell anemia patients.

Keywords :- Sickle cell anemia; Assess ; Effectiveness

Introduction

Sickle cell anemia is linked with a series of inherited blood disorders triggered by a type of hemoglobin named HbS. People afflicted by sickle cell anemia has dual forms of this type of beta globin and HbS are the only hemoglobin present in its blood cells. Sickle cell anemia is especially common in people who paternal ancestry from Sub-Saharan Africa, the peak areas of Spain (Cuba, South America, Central America), India, Morocco, Pakistan, Saudi Arabia and European countries like Greece, Italy, and Turkey¹.

Sickle cell anemia may cause pain such as stiffness of the joint, bone pain, muscle weakness, chest or abdominal pain. It is often not recommended to use over – the counter painkillers (such as ibuprofen, mortin, advil, or aleve) because they can adversely affect the function of the kidney and/or liver. Try to use hot compresses for about 15 minutes up to 2-3 times per day to treat pain spontaneously. Take warm baths or sitting in a hot tub / jacuzzi, massage therapy, exercising or seeing a physical therapist also is a safe solution to prevent deterioration of debilitating symptoms. Beyond healing irritated skin, increasing endurance and encouraging Relaxing, herbs are always an effective way to manage pain. It is possible to apply peppermint essential oil on the skin to decrease muscles sore or joint pain. Some oils that assist relieve problem such as occurrence to decrease; lavender oil to treat with stress management; as well as citrus oils such as grapefruit or orange to help reduce tiredness².

The use of fomentation is on the rise through the world. Fomentation is used in clinics, spas and medical studies. Fostering is more popular than cold fostering. Pain is the most major problem to be handled by hot fomentation. Hot fomentation can be used in a variety of ways, including electric sheets, hot water bottle, hot gel packets or hot baths. Heat vasodilate increases blood flow, supplying cells with oxygen and nutrients, helping to reduce joint pain.

Sickle cell anemia patients who are selected in selected area of Wardha district. The multidisciplinary approach to the management of sickle cell anemia pain includes routine pain assessments, which have been incorporated into the inpatient protocols and allow for application of peppermint oil or hot fomentation.

Pain status includes assessments of pain intensity and pain relief. The present study is based on compare effectiveness of peppermint oil and hot fomentation for joint pain among sickle cell anemia patients in the selected area of Wardha district over a 3 week period³.

Material and Methods

Interventional research approach with True experimental pre and post -test design (two group before intervention, after intervention) was used for the study. Research study was conducted in 12th August to 31th September 2019. At selected area of Wardha district. A sample of 60 sickle cell anemia patients was selected using simple random sampling technique and then assigned the samples in experimental group I (peppermint oil) and experimental group II (hot fomentation). 60 samples were collected. Before intervention pain assessment was done. After that 30 sample were selected for peppermint oil and 30 samples for hot fomentation. Before intervention sensitivity test was done of both group experimental group I (peppermint oil) and experimental group II (hot fomentation). If sensitive to peppermint oil or hot fomentation then they were exclude from the study and informed to physician for further management. If not sensitive to peppermint oil then apply peppermint oil to the experimental group I for 30 sickle cell anemia patients thrice a day for 7 days. Same as if sickle cell anemia patients was not sensitive to the hot fomentation then apply hot fomentation to the experimental group II for 30 sickle cell anemia patients for thrice a day for 7 days.

On the end of the 7th day after intervention assessment of joint pain related symptoms in both groups were done by using pain scale and then compare the effectiveness of peppermint oil and hot fomentation for joint pain.

The study was carried after obtaining permission from the Institutional Ethics Committee (IEC), Datta Meghe Institute of Medical Science (Deemed University) Sawangi (Meghe), Wardha.

The tools used for data collection was pain scale (0-10 scale of pain severity) this was developed based on the objectives of the study and through review of literature. Instrument consists of two sections

Section - A :- Demographic variables.

Interview guide which consists of questions to collect the demographic data like age, gender, type of sickle cell anemia, occupation, major health problem, on medication of sickle cell disease, attended any such type of activity in the past.

Section –B :- Pain scale (0-10 scale of pain severity)

Pain scale was used to assess the level of joint pain. It consists of 0-10 score scale of pain severity with each statements. Categories to respond are mild, moderate, severe, and extreme in each statement. Total score is 10.

Table no.-1 (0-10 scale of pain severity) pain score

Level of joint pain	Score
Mild	0-2
Moderate	3-4
Severe	5-9
Extreme	10

Results

Distribution of sickle cell anemia patients with regards to demographic variables.

In experimental group I (peppermint oil) with regard to age Majority of sickle cell anemia patients 30.00 % were from the age group of 18-22 year, 53.33% were from the age group of 23-27 year and 10.00% of then belonging to the age group of 28-32 and remaining 6.67% were more than 32 years age.with regard to gender 33.33% were males and remaining 66.67 %

were females. With regard to type of sickle cell anemia 56.67% of them had AS patterns and 43.33% had SS patterns. With regard to occupation 10.00% were farmers, 23.33% were labourer, 10.00% were doing private job, 6.67% were doing government job,16.67% were homemaker and remaining 33.33% were students. With regard to any major health problems 23.33% had major health problems and remaining 76.67% not have any major health problems. With regard to on medication of sickle cell anemia 23.33% had on medications of sickle cell disease and remaining 76.67% had not on medications of sickle cell disease.

In experimental group II (hot fomentation) with regard to age Majority of sickle cell anemia patients 23.33% were from the age group of 18-22 years, 26.67% in the age group of 23-27 years and 20.00% of then belonging to the age group of 28-32 and remaining 30.00% were more than 32 years age. With regard to gender 53.33% were males and remaining 46.67 % were females. With regard to type of sickle cell anemia 50.00% had AS pattern and 50.00% had SS patterns. With regard to occupation 23.33% were farmers, 20.00% were labourer, 6.67% were doing private job, 20.00% were doing government job, 26.67% were homemaker and remaining 33.3% were students. With regard to major health problems 10.00% had major health problems and remaining 90% not have any major health problems. With regard to on medication of sickle cell anemia 46.67% had on medications of sickle cell disease and remaining 53.33% had not on medications of sickle cell disease.

Comparison of effectiveness of peppermint oil and hot fomentation for joint pain among sickle cell anemia patients.

Table No.2 : Significance of difference between pain score of hot fomentation and peppermint oil among sickle cell anemia patients.

Overall	Mean	SD	Mean Difference	t-value	p-value
Hot fomentation	2.90	0.71	1.36±0.17	7.59	0.0001 S,p<0.05
Peppermint oil	1.53	0.68			

The above table no.2 shows the comparison of difference in before intervention and after intervention pain scores of sickle cell anemia patients in hot fomentation and peppermint oil. Mean, standard deviation and mean difference values are compared and student's unpaired 't' test is applied at 5% level of significance. The tabulated value for $n=30-2$ i.e. 28 degrees of freedom was 2.05. The calculated 't' value i.e. 7.59 are much higher than the tabulated value at 5% level of significance for overall pain score of sickle cell anemia patients which is statistically acceptable level of significance. Hence it is statistically interpreted that peppermint oil is more effective than hot fomentation among sickle cell anemia patients.

Association of level of after intervention joint pain score of peppermint oil and hot fomentation among sickle cell anemia patients in relation to demographic variables

In experimental group I (peppermint oil) finding shows that demographic variable type of sickle cell anemia, major health problems, and on medication of sickle cell disease had shown significant association with pain score and the other demographic variables are age, gender and occupation had not shown statistically significant association with after intervention pain score.

In experimental group II (hot fomentation) finding shows that demographic variable only age had shown significant association with pain score, and the other demographic variables are gender, type of sickle cell anemia, occupation, major health problems, on medication of sickle cell disease had not shown statistically significant association with after intervention pain score .

Discussion

In present study table no.4 shows comparison of effectiveness of peppermint oil and hot fomentation for joint pain in sickle cell anemia patients, in experimental group I (peppermint oil) mean score 1.53 with standard deviation 0.68 and in experimental group II (hot fomentation) mean score 2.90 with standard deviation 0.71. Hence it is statistically interpreted that peppermint oil is more effective than hot fomentation among sickle cell anemia patients.

Study conducted by Nikita H Chauhan (2017) effectiveness of the hot application and castor oil application in clients with joint pain, among 50 old osteoarthritis patients, result revealed that in experimental group I (hot application) mean score 2.60 with standard deviation 1.155 and in experimental group II (castor oil application) mean score 2.40 with standard deviation 1.041. Hence it is statistically interpreted that castor oil is more effective than hot application among clients with joint pain ⁴.

In present study in experimental group I (peppermint oil) finding shows that demographic variable type of sickle cell anemia, major health problems, and on medication of sickle cell disease had shown significant association with pain score and the other demographic variables are age, gender and occupation had not shown statistically significant association with after intervention pain score.

In experimental group II (hot fomentation) finding shows that demographic variable only age had shown significant association with pain score, and the other demographic variables are gender, type of sickle cell anemia, occupation, major health problems, on medication of sickle cell disease had not shown statistically significant association with after intervention pain score .

Study conducted by Nikita H Chauhan (2017) in a study to evaluate the impact of hot application and castor oil application on joint pain among 50 old osteoarthritis patients in old age homes. In this research, it was observed that in both experimental group demographic variables are age, gender weight, occupation, diet duration of joint pain, daily living activity and habits in patients with joint pain had not shown significant association with after intervention pain score ⁴.

Limitation

The study was limited to sample size i.e 60 (30= experimental group I (peppermint oil), 30= experimental group II (hot fomentation). This might be inadequate to generalize the study findings. More time duration would give more relevant results with variations of any research, but the investigator planned to complete the research work within one month to get more feasibility of getting sample. Therefore, sufficient number of sample

and time duration was required to establish the effects of peppermint oil and hot fomentation for manage pain in sickle cell anemia, in general.

Conclusion

The study compared the effectiveness of peppermint oil and hot fomentation for joint pain among sickle cell anemia patients. From the above findings, it was evidenced that peppermint oil was effective than hot fomentation on relieving joint pain among sickle cell anemia patients.

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References

1. Dr. Axe, Jillian Levy. Sickle Cell Anemia + 5 Natural Treatments to Manage Symptoms. July 22, 2017.Available from -<https://draxe.com/health/sickle-cell-anemia/>
2. John N. A review of clinical profile in sickle cell traits. Oman medical journal. 2010 Jan;25(1):3.-8. DOI: 10.5001/omj.2010.2.
3. Dana L. Davis. Treatments. Physical Therapy. Hot and Cold Therapies for Pain and Discomfort. Spine universe. **Available from-**<https://www.spineuniverse.com/treatments/physical-therapy/hot-cold-therapies-pain-discomfort>
4. Nikita h chauhan, Effectiveness of the Hot Application and Castor Oil Application in Clients with Joint Pain-Literature Review,january 2017, DOI: 10.5958/2320-8651.2017.00015.1
5. Bruce Thompson. Solutions for therapy, traditional hydrotherapy.2017.Available from- <https://www.traditionalhydrotherapy.com/Techniques/Fomentations.html>.
6. Hughes Martin, what are the benefits of hot & cold therapy?Lifestyle, eating, and fashion(2011). Available from - <https://www.leaf.tv/4774454/what-are-the-benefits-of-hot-cold-therapy/>.
7. Cambridge academic content dictionary. Definition of effectiveness @ Cambridge University Press. Available from-<https://dictionary.cambridge.org/dictionary/english/effectiveness>.
8. William C. Shiel Jr. Definition of sickle cell anemia. Rx List. Available from-<https://www.rxlist.com/script/main/art.asp?Articlekey=15689>.
9. Sickle cell disease - Symptoms .National Health Service. Available from- <https://www.nhs.uk/conditions/sickle-cell-disease/symptoms/>.
10. Mighty Nest ,The Essential: 6 Uses For Peppermint Essential Oil, 2016 May 6. Available from- <https://mightynest.com/articles/the-essential-6-uses-for-peppermint-essential-oil>
11. What is sickle cell disease? Johns Hopkins medicine home, Health conditions and disease. Available from- <https://www.hopkinsmedicine.org/health/conditions-and-diseases/sickle-cell-disease>
12. Rajapriya G. Effect of hot application versus contrast therapy on knee related symptoms among patients with knee osteoarthritis in selected community area at Perambalur (Doctoral dissertation, Thanthai Roever College of Nursing, Perambalur). 2017 Sep 08. Available from: <http://repository-tnmgrmu.ac.in/2861/>
13. Platt OS, Thorington BD, Brambilla DJ, et al. Pain in sickle cell disease: rates and risk

- factors. *New England Journal of Medicine*. 1991 (Jul 4); 325(1):11-6. DOI: 10.1056/NEJM199107043250103.
14. Udezue E, Girshab AM. Differences between males and females in adult sickle cell pain crisis in eastern Saudi Arabia. *Annals of Saudi medicine*. 2004 May;24(3):179-82. DOI: 10.5144/0256-4947.2004.179.
 15. McClish DK, Levenson JL, Penberthy LT, et al. Gender differences in pain and healthcare utilization for adult sickle cell patients: The PiSCES Project. *Journal of Women's Health*. 2006 Mar 1;15(2):146-54. DOI: 10.1089/jwh.2006.15.146.
 16. Jain R, Sawhney S, Rizvi SG. Acute bone crises in sickle cell disease: the T1 fat-saturated sequence in differentiation of acute bone infarcts from acute osteomyelitis. *Clinical radiology*. 2008 Jan 1;63(1):59-70. DOI: 10.1016/j.crad.2007.07.017.
 17. Almeida A, Roberts I. Bone involvement in sickle cell disease, *British Journal of Haematology*. 2005 ;129(4):482-90. DOI: 10.1111/j.1365-2141.2005.05476.x
 18. Uwaezuoke SN, Ayuk AC, Ndu IK, et al. Vaso-occlusive crisis in sickle cell disease: current paradigm on pain management. *Journal of pain research*. 2018;11:3141. DOI: - <https://doi.org/10.2147/JPR.S185582>.
 19. Signorelli AA, et al. Pain measurement as part of primary healthcare of adult patients with sickle cell disease. *Revista brasileira de hematologia e hemoterapia*. 2013;35(4):272-7. DOI: 10.5581/1516-8484.20130075.
 20. Sinha CB, Bakshi N, Ross D, et al. Management of Chronic Pain in Adults Living With Sickle Cell Disease in the Era of the Opioid Epidemic: A Qualitative Study. *Jama netw open*. 2019;2(5). DOI: 10.1001/jamanetworkopen.2019.4410.