

# A Comparative Study to Assess the Effectiveness of Application of Coconut Oil Versus Petroleum Jelly on Heel Fissures Among Young Women

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## ABSTRACT

**Introduction:** Heel fissure is one of the commonly existing podiatric conditions in our society. It is associated with excessive dryness leading to cracking of heels. Coconut oil is a versatile product with good moisturizing, nourishing and smoothing effect on skin. Petroleum jelly is a greasy gelatinous substance that has been promoted as a topical ointment for its healing and moisturizing properties. The objective of this study is to compare the effect of application of coconut oil and petroleum jelly on heel fissures among young women.

**Methods:** Thirty young women between the age group 18 – 25 years with heel fissures were selected by non-probability purposive sampling technique. Participants were randomly divided into two groups (Group I – Coconut oil and Group II – Petroleum jelly) with 15 samples in each. Pre – test was done and Coconut oil/Petroleum jelly was applied once daily for 14 days on heel fissures, followed by post- test. Data was collected by observation using a self-prepared checklist and rating scale. The tool is found to be reliable by using inter- rater reliability ( $r = 1.0$ ).

**Results:** It is found that there is a statistically significant difference between pre-test mean score (7.67) and post-test mean score (5.33) of Group I (coconut oil) p value (0.0013). There is statistically significant difference between pre-test mean score (8.53) and post- test mean score (4.13) of Group II (Petroleum jelly) p value (0.0000). The difference in mean score of

coconut oil Group is 2.33 and petroleum jelly is 4.4

**Conclusion:** This study concluded that both coconut oil and petroleum jelly are effective on heel fissures. In comparison, petroleum jelly is more effective than coconut oil in managing heel fissures.

**Keywords:** coconut oil, heel fissures, petroleum jelly, young women

## INTRODUCTION

Heel fissure also known as cracked heel is a common foot problem among people. It is one of the commonly existing podiatric diseases associated with excessive dryness leading to cracking of heels. It is an indication of negligence in foot care as well as lack of moisturizing.<sup>1</sup> Coconut oil is an edible oil derived from the wick, meat, and milk of the coconut palm fruit.<sup>2</sup> Petroleum jelly is a greasy gelatinous substance sourced from petroleum and used as ointment base, lubricant and protective covering. Petroleum jelly is a good way to moisturize heel fissures.<sup>3</sup>

Heel fissure refers to a condition produced by the occurrence of fissures in abnormally hard, dry skin over the heels of the feet. The causes of heel fissure include walking around barefoot, use of hard foot-wear (open sandals) and climate, mostly winter. The main symptoms of heel fissure are pain,

discomfort while standing, itching, bleeding, flaky skin, warmth, redness, and swelling at the site. The management of heel fissures can be done by using foot-wear that cushions the heel pad, applying moisturizer to the affected areas, dressing around the heels to reduce the skin movement.<sup>4</sup>

An attempt has been made to determine the prevalence of fissuring of feet in a rural village in Tamil Nadu. Overall prevalence is found to be 48% for ages 15 years and above. The prevalence is found to be higher in females (58.4%) than in males (33.3%) and it is seen more among the housewives (63.7%) and among the farmers (41.9%). The study concluded that fissuring of feet is a significant problem.<sup>5</sup>

Shashi Gupta, et.al, in 2018 conducted a study on Management of padadari (heel fissure) with RaktaSnuhi (*Euphorbia caducifolia*) based formulation among people of Gujarat. 26 patients diagnosed with Padadari were treated by applying 3g of RaktaSnuhi gel twice daily for 21 consecutive days. Responses to the treatment were evaluated using a specially prepared grading scale. The study yielded statistically significant reduction in symptoms of heel fissure such as pain, itching and dryness.<sup>6</sup>

In 2021 Punit Saraogi, et.al, conducted an experimental study in Mumbai to assess the effectiveness of virgin coconut oil as a prophylactic therapy against alcohol damage on skin in covid times. 60 volunteers who were divided into two groups. One group was given alcohol-based hand sanitizer and other group was given coconut oil after using alcohol-based hand sanitizer for 15 days. The study established that coconut oil maintains the skin integrity and hydration even after using alcohol-based hand sanitizer.<sup>7</sup>

Dr. Zhengchu Tan et.al, in 2020 conducted a study in London to check the effectiveness of petroleum jelly to prevent injury from prolonged use of mask and visors among health care workers. A group of 60 health care workers were selected as samples and were advised to apply petroleum jelly every

half hourly. The study concluded that the use of petroleum jelly reduced the level of friction over skin and prevented skin peeling.<sup>8</sup>

Several studies related to heel fissures, coconut oil and petroleum jelly are conducted earlier. Most of the studies showed the effectiveness of ayurvedic formulations on heel fissures. Some studies proved that coconut oil has an effect on skin problems such as atopic dermatitis, wound epithelization etc. Studies also revealed that petroleum jelly has an effect on skin peeling, nosocomial sepsis etc. Coconut oil and petroleum jelly are easily available at home and have good effect on skin problems but their effect on heel fissures has not been assessed. So, there is a need to study their effect on heel fissures.

### Objectives of the study

- To assess the effect of application of coconut oil on heel fissure among young women.
- To assess the effect of application of petroleum jelly on heel fissure among young women.
- To compare the effect of application of coconut oil versus petroleum jelly on heel fissure among young women.

### Hypothesis:

- (H0)<sub>1</sub>: There is no significant difference before and after the application of coconut oil on heel fissures among young women.
- (H1)<sub>1</sub>: There is a significant difference before and after the application of coconut oil on heel fissures among young women.
- (H0)<sub>2</sub>: There is no significant difference before and after application of petroleum jelly on heel fissures among young women.
- (H1)<sub>2</sub>: There is a significant difference before and after application of petroleum jelly on heel fissures among young women.
- (H0)<sub>3</sub>: There is no significant difference between application of coconut oil

versus petroleum jelly on heel fissures among young women.

- (H1)<sub>3</sub>: There is a significant difference between application of coconut oil versus petroleum jelly on heel fissures among young women.

## MATERIALS AND METHODS

The study adopted pre - experimental research design. Thirty young women with Heel Fissure were recruited by non-probability purposive sampling technique at selected hostels. The hostels inmates included young women who are studying either Nursing or DMLT course. The participants were randomly divided into two groups – Group I (Coconut oil) and Group II (Petroleum jelly) with 15 participants each, by using lottery method. Permission was obtained from the head of the institute. Written informed consent was taken from the participants and Pre-test was conducted. Participants were asked to wash their feet with plain water and dry them. Group-I participants were asked to apply coconut oil and Group-II participants were asked to apply petroleum jelly over the heels for 14

days. All participants were asked to wear socks overnight after the application of coconut oil or petroleum jelly. In this study, observation method was used as the technique for data collection. The research tool consists of three sections which include demographic data, signs and symptoms of heel fissures, and measurement of heel fissure. Content validity of tool was obtained from 10 experts. The tool was found to be reliable with r value 1.0 using inter-rater reliability. Pilot study was conducted on ten percent of the study sample size and the study was found to be feasible.

## RESULTS

Demographic data: Majority of the participants (44%) were 18 years of age. The body weight for 44% of the participants was between 41 to 45 kg. 90% of the participants had dry skin on their feet. Majority of participants (93%) were using open back type of footwear and 71% used socks sometimes. (Table 1)

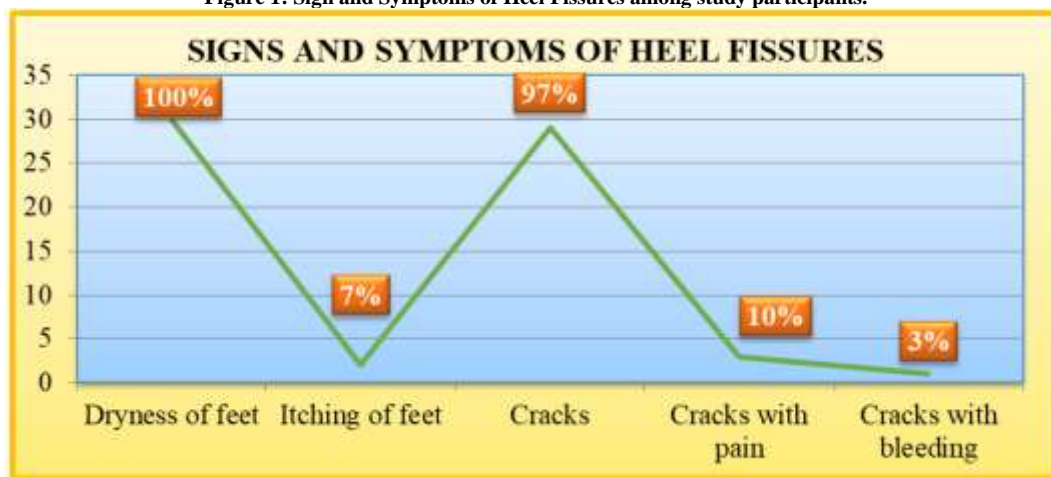
Table 1 - Analysis of demographic data in terms of frequency and percentage.

TABLE 1: DEMOGRAPHIC VARIABLES		
	Number of participants	Percentage
<b>AGE DISTRIBUTION OF STUDY PARTICIPANTS (n = 30)</b>		
18yrs	13	44%
19yrs	12	40%
20yrs	4	13%
21yrs	1	3%
<b>WEIGHT OF STUDY PARTICIPANTS (n = 30)</b>		
36-40Kg	1	3%
41-45Kg	13	44%
46-50Kg	8	27%
51-55Kg	4	13%
56-60Kg	3	10%
61-65Kg	1	3%
<b>TYPE OF SKIN OF FEET OF STUDY PARTICIPANTS (n = 30)</b>		
Dry	27	90%
Oily	3	10%
Normal	0	0%
<b>TYPE OF FOOTWEAR OF STUDY PARTICIPANTS (n = 30)</b>		
Open back	28	93%
Closed back	0	0%
Both	2	7%
<b>USE OF SOCKS IN STUDY PARTICIPANTS (n = 30)</b>		
Never	7	26%
Sometimes	19	71%
Always	4	3%
<b>SIGNS AND SYMPTOMS OF HEEL FISSURES (n = 30)</b>		
Dryness of feet	30	100%
Itching of feet	2	7%

Cracks	29	97%
Cracks with pain	3	10%
Cracks with bleeding	1	3%
<b>SEVERITY OF HEEL FISSURES IN STUDY PARTICIPANTS (n = 30)</b>		
Mild ( $\leq 5$ )	1	3%
Moderate (6-10)	26	87%
Severe (11-15)	3	10%
Extreme (16-20)	0	0%

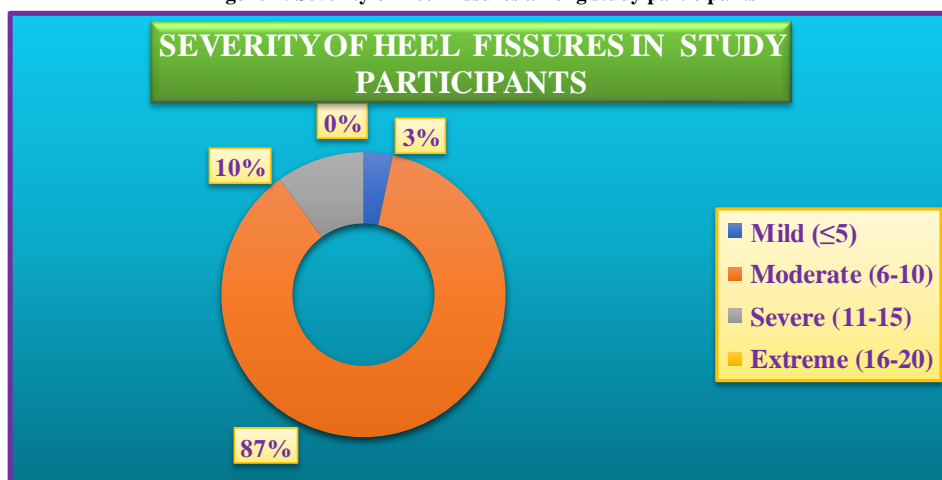
**Sign and Symptoms:** The signs and symptoms of heel fissures among the study participants were as follows - dryness of feet (n = 30), cracks (n = 29), cracks with pain (n = 3), itching of feet (n=2) and cracks with bleeding (n = 1). (Figure. 1)

Figure 1: Sign and Symptoms of Heel Fissures among study participants.



**Severity of heel fissures:** Among all the participants 3% had mild heel fissures, 87% had moderate heel fissures, 10% had severe heel fissures whereas none had very severe heel fissures. (Figure. 2)

Figure 2: Severity of Heel Fissures among study participants



Comparison of pre-test (7.67) and post-test (5.33) heel fissure scores of Groups I (Coconut oil) shows decrease in post test score in comparison with pre-test score. (Table 2) The difference in mean score is

2.33 and p value is 0.0013 and the comparison of pre-test (8.53) and post-test (4.13) heel fissure scores of Groups II (Petroleum jelly) shows decrease in post test score in comparison with pre-test score. The

difference in mean score is 4.4 and p value is 0.000. (Table 3)

Since the difference in mean scores of coconut oil group is 2.33 and petroleum

jelly group is 4.4, it is evident that petroleum jelly is more effective than coconut oil in reducing severity of heel fissures.

Table 2- Pre-test and Post-test heel fissure mean scores of Groups I (Coconut oil)

Table 2: Pre-test and Post-test heel fissure scores of Group I (Coconut oil) (n=15)					
	n	Mean	SD	Difference in mean	p-value
Pre- test score	15	7.67	1.54	2.33	0.0013
Post- test score	15	5.33	2.53		

Table 3- Pre-test and Post-test heel fissure mean scores of Groups II (Petroleum jelly)

Table 3: Pre-test and Post-test heel fissure scores of Groups II (Petroleum jelly) (n=15)					
	n	Mean	SD	Difference in mean	p-value
Pre- test score	15	8.53	1.92	4.4	0.0000
Post- test score	15	4.13	2.06		

## DISCUSSION

The results of the study shows that coconut oil is effective in reducing the severity of heel fissures. Petroleum jelly was also found to reduce the severity of heel fissures. In comparison petroleum jelly was more effective than coconut oil in reducing the severity of heel fissures.

Coconut oil and petroleum jelly are known for their moisturizing effects. Several studies have proved the effectiveness of coconut oil for treating skin conditions. A study compared the effect extra virgin coconut oil with mineral oil as a moisturizer for mild to moderate xerosis. Coconut oil showed significant improvement in skin hydration than mineral oil.<sup>9</sup> A study in Mumbai showed the effectiveness of virgin coconut oil in maintaining the skin integrity and hydration after using alcohol-based hand sanitizer.<sup>7</sup> A study done by Somlak Kongmuang in 2012 has concluded the effectiveness of cream stick preparation containing natural oil, coconut oil and rice bran oil as a moisturizing agent for heel fissures.<sup>10</sup> The findings of these studies [7, 9, 10] are similar to the present study where coconut oil is found to have moisturizing effect on skin and thereby was effective in reducing the severity of heel fissures.

The study conducted by Dr. Zhengchu Tan et.al in 2020 concluded that the use of petroleum jelly reduced the level of friction over skin and prevented skin peeling. Similarly, in the present study, it was

evident that application of petroleum jelly significantly reduced the severity of heel fissures.<sup>8</sup>

### Limitations of the study:

- The sample size was limited to 30 which can make generalization of findings difficult.
- Majority of the participants had moderate severity of heel fissures. Both coconut oil and petroleum jelly significantly reduced the severity of moderate heel fissures. The effectiveness of coconut oil and petroleum jelly on severe heel fissures need to be explored separately.
- The study is done among young women between 18 to 25 years of age, therefore generalization of findings on men or other age groups remains unexplored.
- The time duration of intervention was limited to 14 days. Longer duration of intervention may help in further reducing the severity score of heel fissures.

### Recommendations for future studies:

- The study can be done on men with heel fissures.
- The study can be done on different age groups.
- The study can be done in different settings.



- The study can be done by extending the time duration of intervention.

## CONCLUSION

This study concluded that both coconut oil and petroleum jelly are effective on heel fissures. In comparison, petroleum jelly is more effective than coconut oil in managing heel fissures. Both can serve as effective remedies in managing mild to moderate heel fissures.

### Declaration by Authors

**Ethical Approval:** Approved

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**Conflict of Interest:** The authors declare no conflict of interest.

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