Effectiveness of Scalpel Debridement versus Excision of Plantar Corn

Avinash K[1], Riya Rai[2*], Kaushik S Reddy[3] , Pooja C Shekar [4] , Vinyas Shraffi Venkatesh[5]

[1] Assistant Professor, Department of General Surgery, Kasturba Medical College, Mangalore, Karnataka, India
[2*] Corresponding Author - General Surgery Resident, Kempegowda Institute of Medical Sciences and Research Centre, Bengaluru, Karnataka, India
[2,3]General Surgery Resident, Kempegowda Institute of Medical Sciences and Research Centre, Bengaluru, Karnataka, India
[4,5]General Surgery Interns, Kempegowda Institute of Medical Sciences and Research Centre, Bengaluru, Karnataka, India

ABSTRACT
Background: Plantar calluses are a common cause of foot pain, which can have a detrimental impact on the mobility of affected patients. Scalpel debridement is often the first treatment used for this condition. Our aim was to evaluate the effectiveness of scalpel debridement of painful plantar calluses over Excision.
Methods: This study was A parallel-group Prospective Randomized Controlled Trial, between the period of February 2021-May 2021 on
50 participants with painful plantar corns were taken in as subjects at Kempegowda Institute of Medical Sciences and Research Centre, Bengaluru, Karnataka , India.
Results: In the study among subjects with Corn
Conclusions: Scalpel debridement is a better go to than compared to Excision of Corn

Keywords: Corn, callus, foot, Scalpel debridement, Corn excision Participants were randomly allocated to one of two groups: Scalpel debridement and Excision participants were followed for twelve weeks after their initial intervention appointment. The primary outcomes measured were the difference between groups in pain (measured on a visual analogue scale) immediately post-intervention, and at one, three and six weeks post-intervention.

INTRODUCTION

A corn, also known as a "heloma" or "focal intractable plantar hyperkeratosis," is a type of callosity. A corn should be distinguished from a callus, which is a more diffuse type of callosity. Thus, a corn is a well-delimited focal area of hyperkeratosis.[1] It is a protective body reaction that produces an excess of horny epithelial layer to prevent skin ulceration. This explains the preferential location of corns next to the condyles of the metatarsals and phalanges as well as the occurrence of corns in patients with a foot deformity.[1] Corn is a localised, smaller, deeper lesion with palpable tender nodule having a yellow white core of cornified dead skin in the centre. It is common in soles, tips of toes. Often corns are multiple and bilateral. It is often due to friction like using ill-fitting footwear. Corns are painful and tender. It is an area of well circumscribed hyperkeratosis of the skin with a dry, smooth and slightly convex surface caused by intermittent direct pressure exerted on a small area.[5,6] Its size varies from 1 mm to 2 cm and it is conical in shape. It is composed of a cone shaped wedge of compressed hyperkeratotic stratum corneum with the base of the cone towards the surface of the skin and the apex pointing inwards. It presses upon the adjacent tissues and causes severe pain when pressed due to pressure on the nerves.[7] Corn can be commonly hard in the sole or rarely soft corn occur between 4th and 5th toes due to friction of bases of adjacent proximal phalanges.[2] Corn may be painful particularly when it is rubbed. Corn has a tendency to recur after excision.[3]

There are two main variants of corn:[4]

- Hard corn ('heloma durum') – The most common type, usually located over the lateral and dorsal aspect of the fifth toe as well as on the dorsal aspect of the interphalangeal joints of the lesser toes.
- Soft corn or interdigital corn ('heloma molle') – a painful hyperkeratotic lesion, mostly seen in the interdigital web spaces, especially the fourth space. This location often leads to maceration of the corn, with sometimes, the occurrence of a bacterial or fungal infection.

 Corn consists of severe keratoses with central degenerated dead cells and cholesterol. If conservative measures fail and the corn is painful, it should be excised with particular care to take off the deep root of the central core. [3] This often prevents recurrence. Corn should be differentiated from plantar wart by removing the top layer of the lesion so as to expose dead deep core of corn or soft branching process of wart.[2] Prognosis lthough corns and calluses are a chronic, recurrent issue, most of them gradually go away when the repeated friction or pressure causes them to be eliminated. Nevertheless, if corns do not go away or if they started to cause severe pain, then the patient should be checked by a dermatologist or podiatrist.[1]

Complications

- Ulceration
- Tenia pedis
- Septic arthritis
- Osteomyelitis

Despite corns being such a common foot complaint, there is little evidence for the most effective treatment for long term resolution. The 'usual' treatment is excision with a scalpel by a podiatrist/General Surgeon and this is often repeated at regular intervals as the corn reoccurs. No comparisons have been made between scalpel debridement of corn and the 'usual' excision of corns, in terms of patient benefit or cost effectiveness, and the majority of evidence has only considered immediate outcomes[3]

METHOD:

This study was a parallel-group Prospective Randomized Controlled Trial, between the period of February 2021- May 2021 on 50 participants with painful plantar corns were taken in as subjects in Kempegowda Institute of Medical Sciences and Research Centre, Bengaluru, Karnataka , India.

Inclusion criteria

All patients presenting with painful plantar sores clinically diagnosed as Plantar corns Patients Above 18 years of age

Exclusion criteria

Patients below 18 years of Age Pressure sores Plantar callosities Patients with plantar sores were subjected to scalpel debridement and corn excision by randomisation. The hyperkeratotic tissue surrounding and over the corn area is paired with no. 21-22 sterile surgical blade till erythema or transition from hard to less hard tissue occurs. The central core or kernel of the corn is visible more clearly after the above procedure. The patient is explained that at the point when he or she feels pain sensation or an increase in the pain sensation, he or she should immediately inform to surgeon, because, this is the end point of the procedure and the surgeon should withdraw the debridement without further extension into the tissue. The pressure bandage is applied over the wound and the patient is instructed to use soft foot wear. The dressing is changed after 5 days. All the patients were followed up for a period of 3 months.

DISCUSSION

ADVANTAGES

➢ A simple and safe office procedure.
➢ The incidence of recurrence is reduced as the whole corn with the central core is excised in toto
➢ Multiple corns can be removed in a single session.
➢ There is immediate pain relief, no requirement of rest and the patient can return to the workplace immediately.
➢ No local anaesthesia is required, so the pain associated with the injection of local anaesthesia on the plantar or palmar site is eliminated.
➢ Above all its is a very economical method for removal of corns.

DISADVANTAGES

➢ This method cannot be used for the removal of very large corns.

References for Statistical Methods:

1. Dakhale GN, Hiware SK, Shinde AT, Mahatme MS. Basic biostatistics for post-graduate students. Indian J Pharmacol. 2012;44(4):435-442.
2. Sunder Rao P S S , Richard J: An Introduction to Biostatistics, A manual for students in health sciences , New Delhi: Prentice hall of India. 4th edition. 2006; 86-160.
3. Elenbaas, RM, Elenbaas, JK, Cuddy, PG. Evaluating the medical literature, part II: Statistical analysis.Ann Emerg Med. 1983;12:610–620.

Statistical analysis:

Data was entered into Microsoft excel data sheet and was analyzed using SPSS 22 version software. Categorical data was represented in the form of Frequencies and proportions. **Chi-square test** was used as test of significance for qualitative data. Continuous data was represented as mean and standard deviation. **Independent t test** was used as test of significance to identify the mean difference between two quantitative variables and qualitative variables respectively.

Graphical representation of data: MS Excel and MS word was used to obtain various types of graphs such as bar diagram.

p value (Probability that the result is true) of <0.05 was considered as statistically significant after assuming all the rules of statistical tests.

Statistical software: MS Excel**,** SPSS version 22 (IBM SPSS Statistics, Somers NY, USA) was used to analyze data.

Results

Table 1: Mean Age Comparison between two groups

| | Group | | | | p value |
| | Group 1 | | Group 2 | | |
	Mean	SD	Mean	SD	
Age	37.48	15.08	38.6	13.1	0.78

Mean Age in Group 1 was 37.48 ± 15.08 and in Group 2 was 38.6 ± 13.1. There was no significant difference in mean Age comparison between two groups.
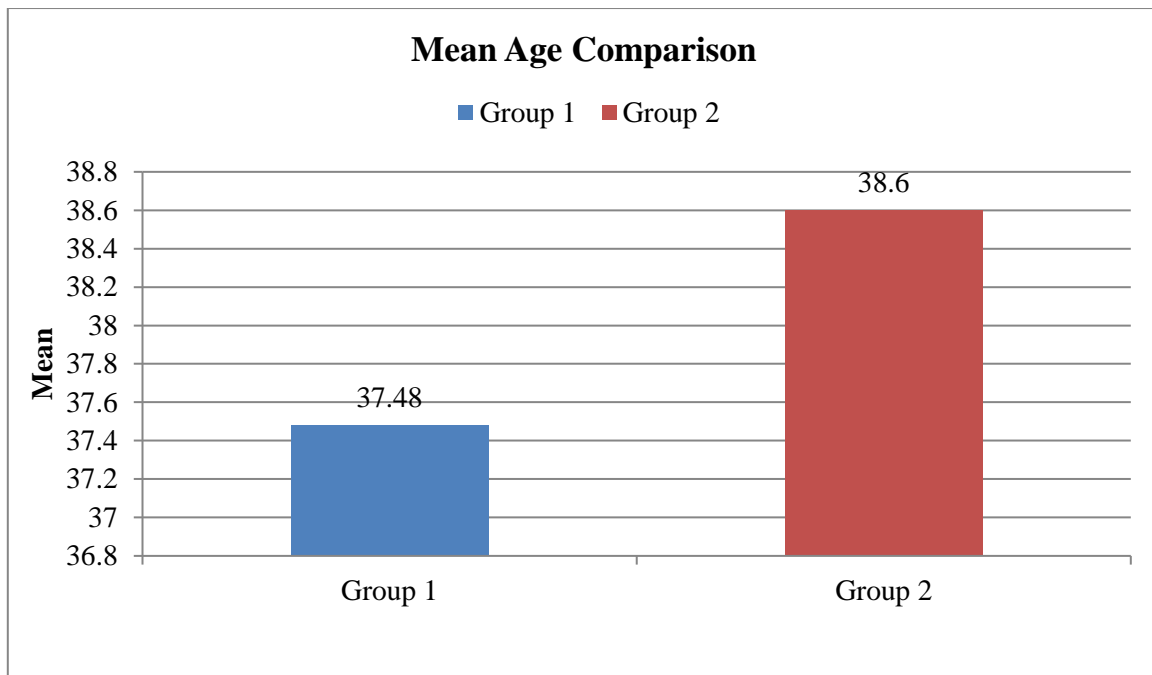
Mean Age Comparison

■ Group 1 ■ Group 2

Figure 1: Bar Diagram Showing Mean Age Comparison between two groups

Table 2: Mean Duration Comparison between two groups

	Group				p value
	Group 1		Group 2		
	Mean	SD	Mean	SD	
Duration	35.2	54.9	81.88	76.44	0.02*

Mean Duration in Group 1 was 35.2 ± 54.9 and in Group 2 was 81.88 ± 76.44. There was a significant difference in mean Duration comparison between two groups.
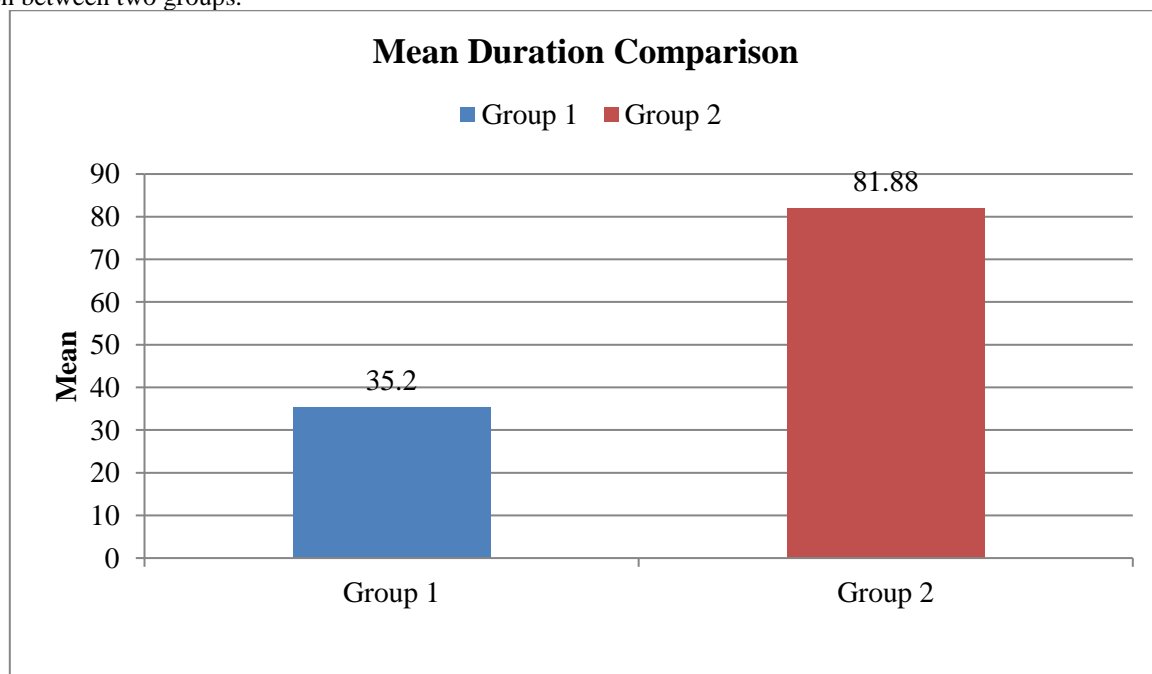
Mean Duration Comparison

■ Group 1 ■ Group 2

Figure 2: Bar Diagram Showing Mean Duration Comparison between two groups

Table 3: Gender Distribution between two groups

	Group	
	Group 1	Group 2

		Count	%	Count	%
Gender	Female	12	48.00%	12	48.00%
	Male	13	52.00%	13	52.00%

$\chi2 = 0.000$, df = 1, p = 1.000

In Group 1, 48.00% were Female and 52.00% were Male.

In Group 2, 48.00% were Female and 52.00% were Male.

There was no significant difference in gender distribution between two groups.
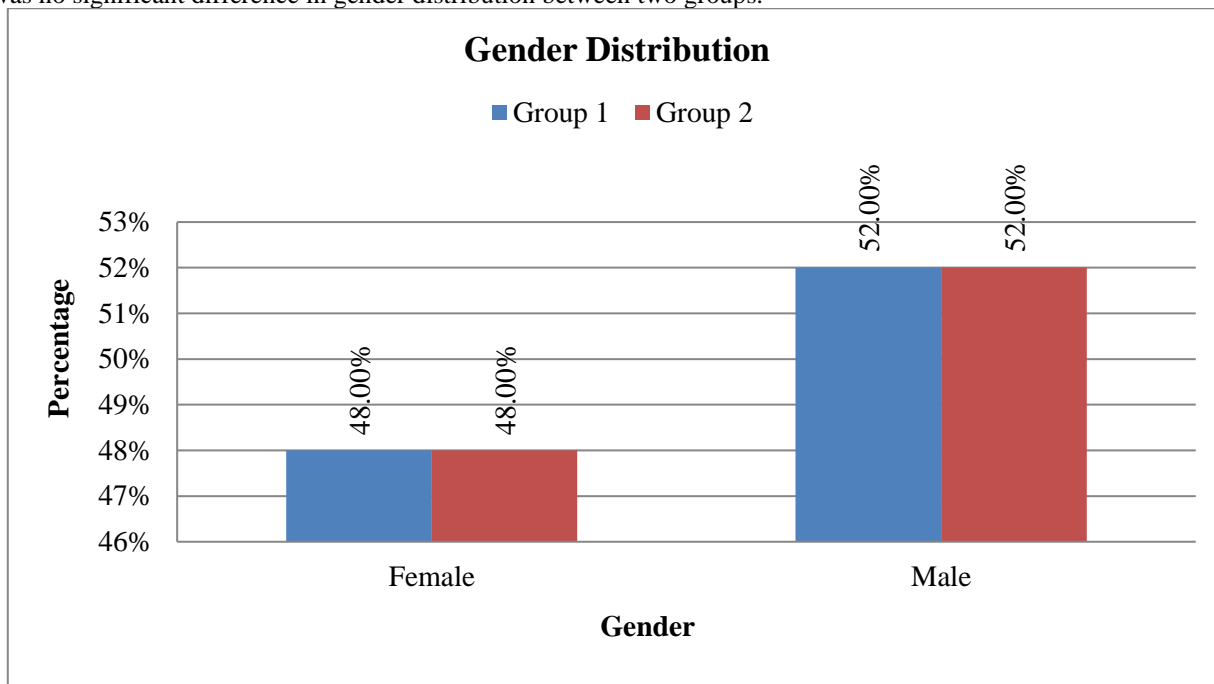

Figure 3: Bar Diagram Showing Gender Distribution between two groups

Table 4: Occupation Distribution between two groups

		Group			
		Group 1		Group 2	
		Count	%	Count	%
Occupation	Driver	1	4.00%	2	8.00%
	Farmer	3	12.00%	9	36.00%
	Housemaid	7	28.00%	7	28.00%
	Housewife	5	20.00%	5	20.00%
	Plumber	3	12.00%	0	0.00%
	Police	6	24.00%	2	8.00%

$\chi2 = 8.333$, df = 5, p = 0.139

In Group 1, 4.00% were Driver, 12.00% were Farmer, 28.00% were Housemaid, 20.00% were Housewife, 12.00% were Plumber and 24.00% were Police.

In Group 2, 8.00% were Driver, 36.00% were Farmer, 28.00% were Housemaid, 20.00% were Housewife and 8.00% were Police.

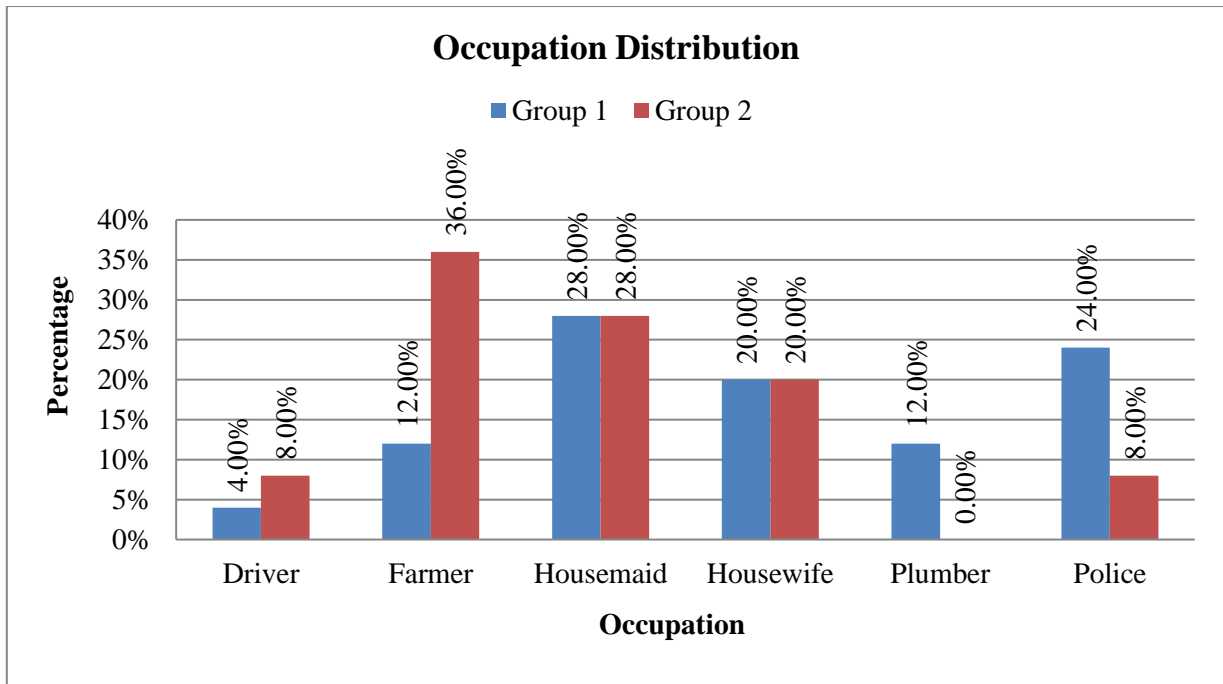There was no significant difference in occupation distribution between two groups.

Figure 4: Bar Diagram Showing Occupation Distribution between two groups

Table 5: Size Distribution between two groups

| | | Group | | | |
| | | Group 1 | | Group 2 | |
		Count	%	Count	%
Size	1x1cm	6	24.00%	8	32.00%
	2x1cm	2	8.00%	5	20.00%
	2x2cm	7	28.00%	1	4.00%
	3x3cm	10	40.00%	11	44.00%

$\chi 2 = 6.119$, df = 3, p = 0.106

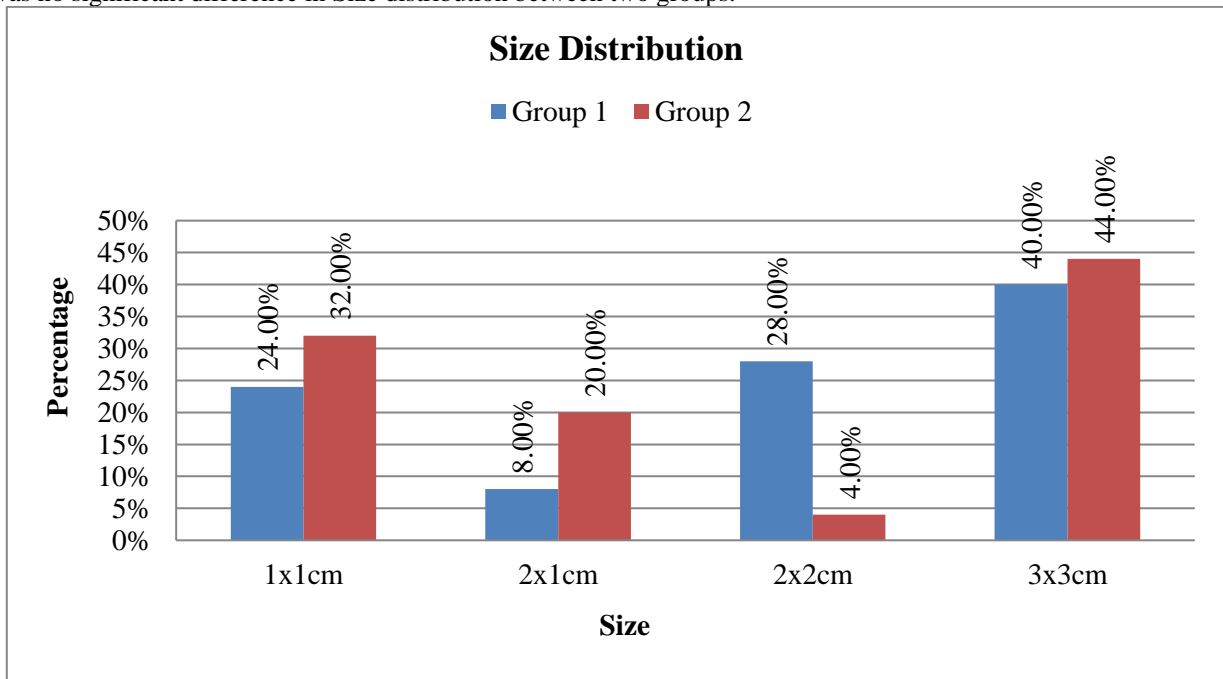There was no significant difference in Size distribution between two groups.

Figure 5: Bar Diagram Showing Size Distribution between two groups

Table 7: Pain Post-op Distribution between two groups

		Group			
		Group 1 (Excision)		Group 2 (Scalpel Debridement)	
		Count	%	Count	%
Pain post-op	2	0	0.0%	6	24.0%
	3	12	48.0%	13	52.0%
	4	7	28.0%	4	16.0%
	5	6	24.0%	2	8.0%
Mean ± SD		3.76 ± 0.831		3.08 ± 0.862	

$\chi2$ = 8.858, df = 3, p = 0.031*

In Group 1, 48.00% had Post OP Pain Score of 3, 28.00% had 4 and 24.00% had 5. In Group 2, 24.00% had Post OP Pain Score of 2, 52.00% had 3, 16% had 4 and 8% had Score 5.

Mean Pain score in Group 1 was .76 ± 0.831 3.08 ± 0.862 and in Group 2 was 3.08 ± 0.862. There was significant difference in Pain Sore between two groups. Pain Score was less in Group 2 compared to Group 1.
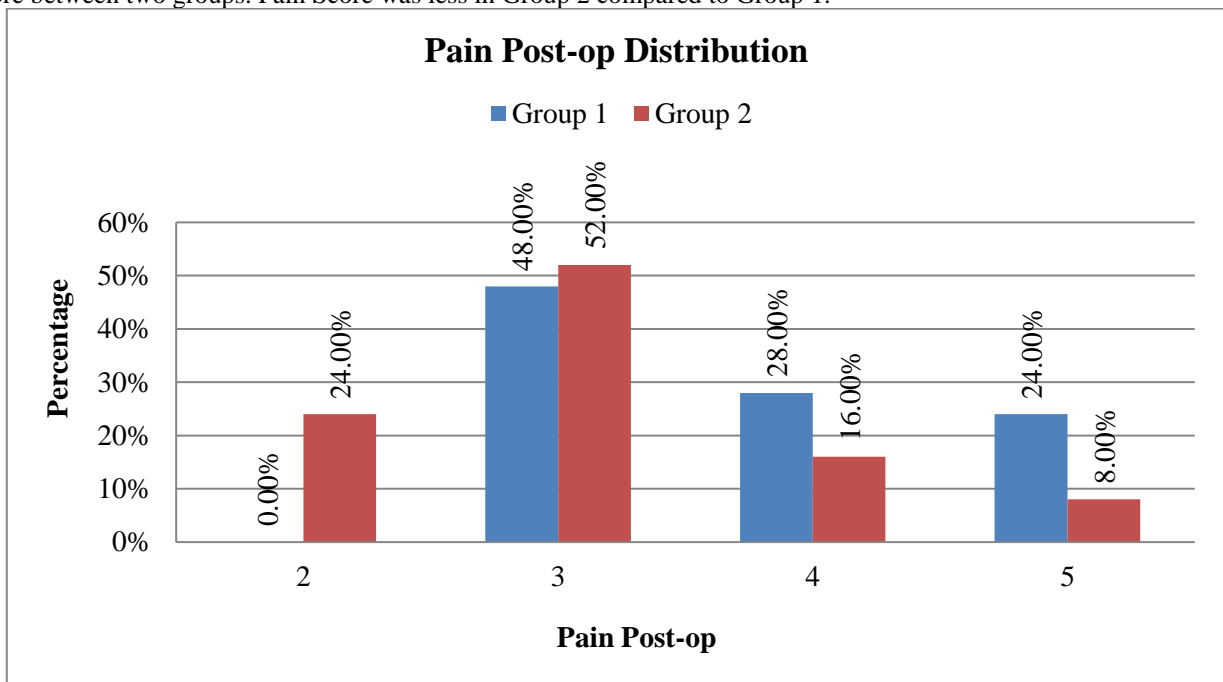

Figure 6: Bar Diagram Showing Pain Post-op Distribution between two groups

Table 8: Discharge Post-op Distribution between two groups

		Group			
		Group 1		Group 2	
		Count	%	Count	%
Discharge post-op	Absent	22	88.00%	23	92.00%
	Present	3	12.00%	2	8.00%

$\chi2$ = 0.222, df = 1, p = 0.637

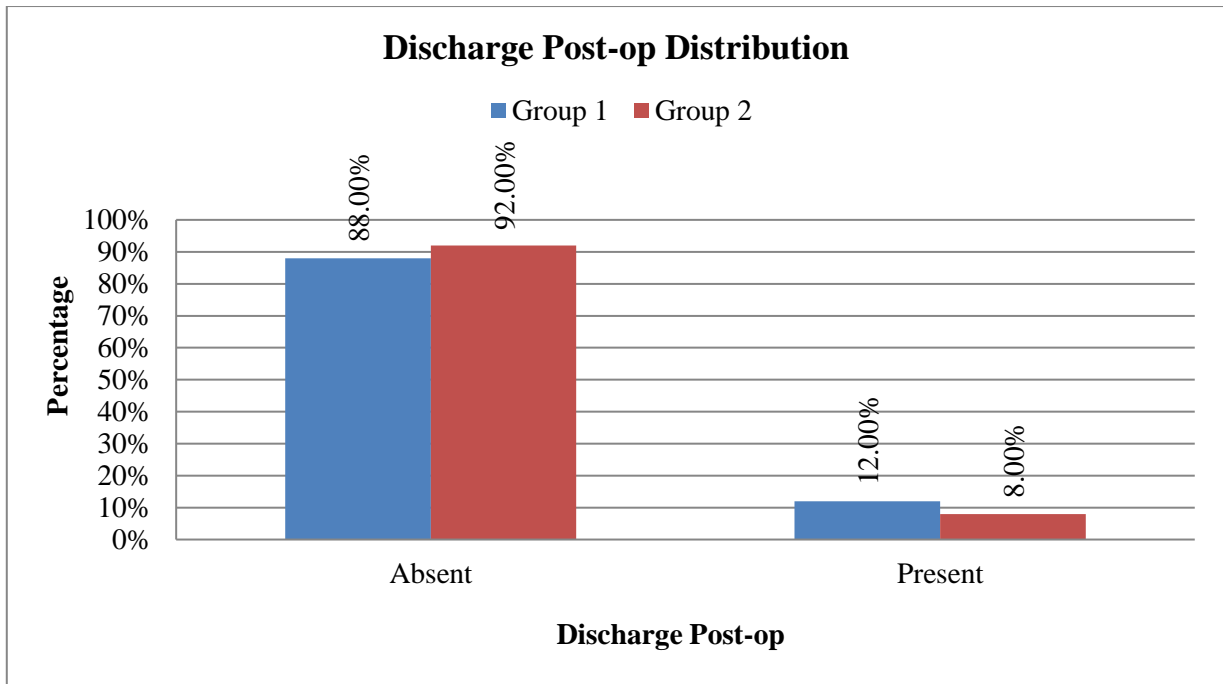There was no significant difference in Discharge Post OP distribution between two groups.

Figure 7: Bar Diagram Showing Discharge Post-op Distribution between two groups

Table 9: Recurrence Post-op Distribution between two groups

		Group			
		Group 1		Group 2	
		Count	%	Count	%
Recurrence post-op	Nil	24	96.00%	22	88.00%
	Recurrence	1	4.00%	3	12.00%

$\chi2$ = 1.087, df = 1, p = 0.297

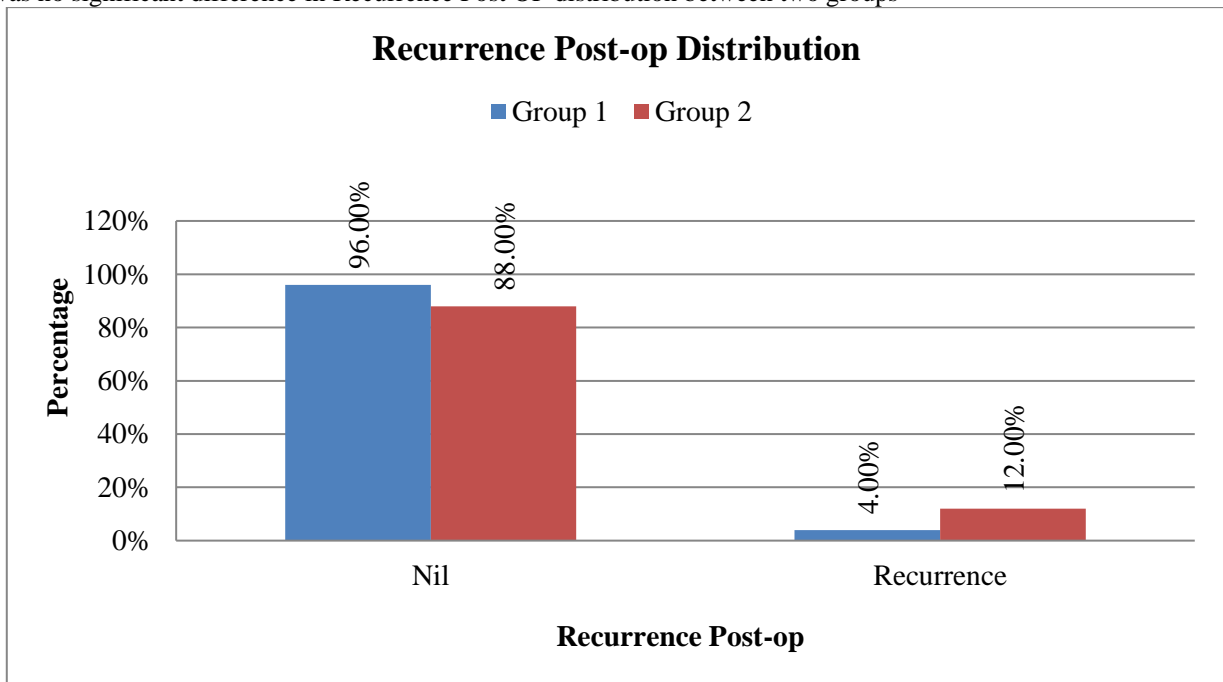There was no significant difference in Recurrence Post OP distribution between two groups

Figure 8: Bar Diagram Showing Recurrence Post-op Distribution between two groups

Table 10: Follow Up Distribution between two groups

		Group		Group	
		Group 1		Group 2	
		Count	%	Count	%
Follow-up	3 months	21	84.00%	25	100.00%
	No	4	16.00%	0	0.00%

$\chi 2 = 4.348$, df = 1, p = 0.037*

In Group 1, 84.00% had follow up in 3 months and 16.00% didn't had. In Group 2, 100.00% had follow up in 3 months. There was a significant difference in Follow Up distribution between two groups.
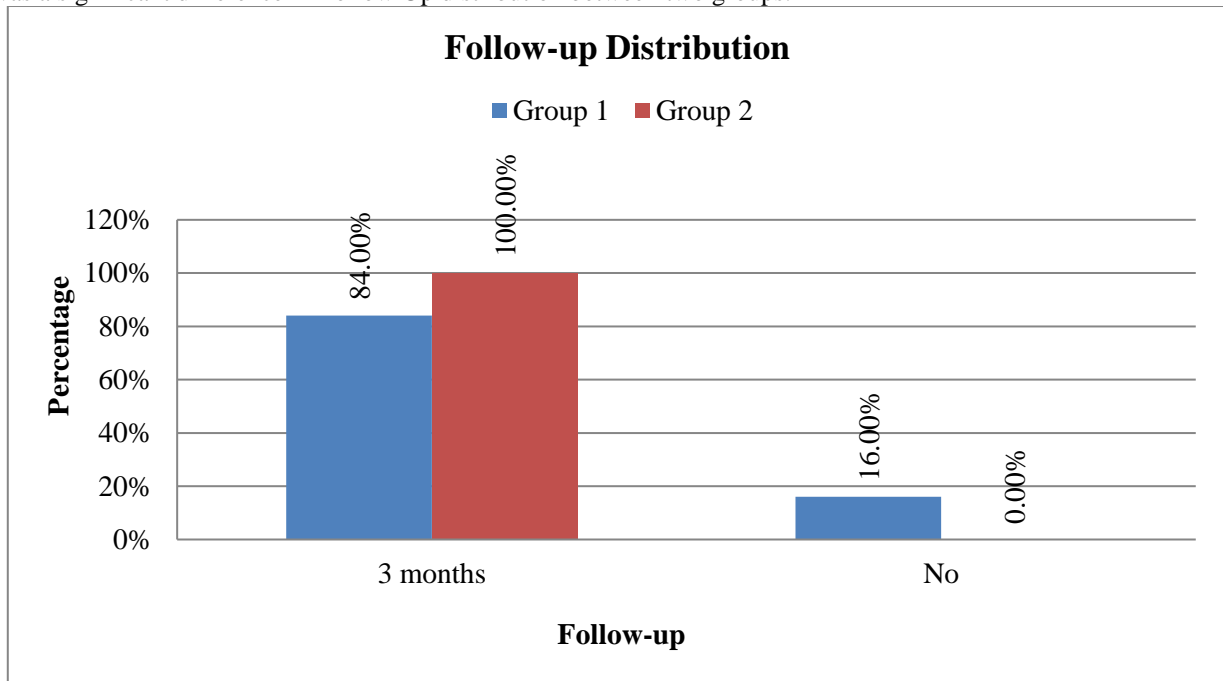
Figure 9: Bar Diagram Showing Follow-up Distribution between two groups

DECLARATIONS

REFERENCES

1. Statpearls.com Author: Ahmad Al Boud. PubMed article on Corn
2. SRB's Clinical Methods in SURGERY. First Edition: 2010. Page 80-81.
3. A concise Textbook of Surgery. S Das. 6th Edition. COMMON TUMOURS AND MISCELLANEOUS LESIONS OF THE SKIN. Page 151.
4. Singh D,Bentley G,Trevino SG, Callosities, corns, and calluses. BMJ (Clinical research ed.). 1996 Jun 1;   [PubMed PMID: 8646101]
5. Benett RG. Lesions of the surface epidermis. Fundamentals of cutaneous surgery. In: Benett RG, editor. 1st ed. St. Louis: The CV Mosby Company; 1988. p. 692-706.
6. 2. Gibbs RC, Boxer MC. Abnormal biomechanics of feet and the cause of hyperkeratosis. J Am Acad Dermatol 1982;6:1061-9.
7. Journal of Cutaneous and Aesthetic Surgery - Jan-Mar 2012, Volume 5, Issue 1