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Original Research Article

Effectiveness *Acalypha indica* on the Management of Cough

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Abstract

This is a quasi-experimental study to determine the internal administration of *Acalypha indica* leaves powder in management of cough. Cough is a natural reflex expulsive defense mechanism of the body, for clearing excess secretions or mucous or inhaled irritants or toxins or foreign substance in the respiratory tract it is the commonest symptom of respiratory diseases. Productive cough means a sudden, noisy expulsion of air from the lungs that effectively removes sputum from the respiratory tract and helps clear the airways, permitting air to reach the alveoli. The treatment of coughs is one area where the use of certain herbal remedies remains common today. In the Siddha system *Acalypha indica* herb is considered to be effective medicine for cough. This is an annual herb belongs to Family Euphorbiaceae. The researcher administered questionnaire was used to collect data. Fifty (50) clinically diagnosed productive cough patients were randomly selected at District Siddha Ayurveda Hospital, Kopalapura and symptoms were evaluated based on scoring system. Evaluation visit were made baseline on 7^{th}, 14^{th}, 21^{st} , 40^{th} day interval, after final assessment were observed after one week for getting information about recurrence of disease. The effect of treatment was evaluated on basis of changes of degree of symptoms after treatment.Statically highly significant improvement ($p<0.000$) in reduce of bouts of cough, sputum expulsion, throat irritation and nasal discharge.

Keywords: Irumal Noei, Cough, Acalypha indica.

INTRODUCTION

Siddha system was formulated and established about more than 25000 years back by the eminent powers called Siddhas and hence the name Siddha Medicine .The medicines were prepared by the various research work done by the Siddhas on herbs, minerals and animals. In Siddha medicine Irumal is compared with cough in modern aspect. In modern medicine cough is one of the symptom of most of the respiratory disorders but siddha text mentioned Irumal as one of the disease. Kaasam and Elai also the other names for Irumal (Cough) in siddha medicine [1].

Cough is a natural reflex expulsive defense mechanism of the body, for clearing excess secretions or mucous or inhaled irritants or toxins or foreign substance in the respiratory tract, it is the commonest symptom of respiratory diseases. It is caused by mechanical or chemical stimulation of cough receptors in the epithelium of the pharynx, larynx. Coughing protects the respiratory system by clearing it voluntarily or involuntarily. As long as cough is helpful in get ridding of infectious material with the help of mucous from the airway [2].

Productive cough means a sudden, noisy expulsion of air from the lungs that effectively removes sputum from the respiratory tract and helps clear the airways, permitting air to reach the alveoli. It can be caused due to Viral or bacterial lung infections, other more serious diseases like asthma, pneumonia, chronic obstructive pulmonary disease (COPD), lung abscesses or other conditions like bronchitis lifestyle factors like smoking. A classic symptom of productive cough is coughing with sputum or phlegm production. Phlegm usually contains mucus with bacteria, debris or dead tissue, and sloughed-off cells.

Deep breathing, with contraction of the diaphragm and intercostal muscles and forceful exhalation, promotes productive coughing in patients with respiratory infections. Mucolytic agents liquefy mucus in the respiratory tract so that it can be raised and expectorated more easily. Atropine and other anticholinergic drugs decrease pulmonary secretions.

The treatment of coughs is one area where the use of certain herbal remedies remains common today. Herbal drugs play an important role in the management of various types of cough. Currently available therapies for cough include cough suppressants [2].

The number of diseases treated with herbs which are common in Siddha system of medicine. The herbs used in different forms for various diseases. There are many specific herbs available to cure cough. Acalypha indica is one such herb which also known as kuppaimeni in Tamil. In the Siddha system this herb is considered to be effective medicine for cough [3].

Acalypha indica is belongs to family euphorbiaceae. The plant is commonly known as kuppeimeni ni tamil kuppameniya in Sinhala. It's found through the plains of Sri Lanka and India. It is an annual herb. Leaves, root and whole plant are used for medicinal purposes. The plant is bitter, acrid, expectorant, purgative, emetic, gastrointestinal irritant and diuretic. The root and leaves are specially used for skin diseases [4].

Murugesamuthaliyar, 2008 stated that the root of Acalypha indica can be treated the fever in following quotation form.
";je;j% yg;gpzpjPj; je;jpLGz ru;ttplk;
ce;JFd;kk; thjk; cjpu%-ye;jpdT
#yQ;R thrk; njhlHgP rq;fgk;Nghk;
Qhyq;nfhs; Nkdpaj dhy;"

Though it is mentioned in the text book there is no scientific evidence so far. Hence, researcher has conducted the above study to prove it in scientific way.

Objective of the study

- To identify the effectiveness of leaves powder of Acalypha indica on productive cough (Kapha Irumal)

MATERIALS AND METHODS

Collection of plant

Leaves of the Acalypha indica collected from Nilveli (Jaica), Kappalthurai and Konesapuri area. This plant distributed in South India, Ceylon and in tropical Africa. It is a common plant in Ceylon.

Study Design
This is the Quasi-experimental study.

Study area

Expected research area rural siddha Ayurveda hospital Kopalapuram, Nilaveli.

Study Population

10 patients were selected based on the randomized schedule for this study.

Instruments

Interviewer administrated questionnaire was used to collect the data.

Inclusion Criteria

Age: Patients were selected between age group of 20-60 years
Sex: Both sexes
Sign & symptoms: Patient with productive cough
Nasal discharge
Throat irritation

Exclusion Criteria

Pregnant & lactating mother
Known patients with Asthma, TB and Diabetes
Smokers
Dry cough

Method of Data Collection

The study was conducted in Kopalapuram Ayurveda hospital for one month. Ten patients were selected randomly based on the inclusion and exclusion criteria in outpatient division with their concer in written form.

Assessment of the disease performed through the History taking, General examination and systemic examination. The research drug was given orally from the first day in the dose of 2g twice a day with warm water for one month.

The clinical evaluation of the patient was performed once in a three days in first two follow up visits and other remaining days was evaluated once in a week and results of degree of sign and symptoms were recorded. Effect of treatment was evaluated on the basis of changes in the signs and symptoms between the before and after the treatment.

Sign and symptoms were evaluated based on following criteria. Symptoms of bought cough, sputum expulsion, throat irritation and nasal discharge were considered as clinical parameters and recorded at every visit.

At the same time the patients were advised to follow the appropriate diet and regimen such as avoid exposure to cold climate and dust environment, avoid bath in early morning and evening, avoid intake of cold water and cold foods such as curd, mutton and cucumber etc.

Assessment Criteria

The following assessment criteria were graded as follows:-

1. Bouts of Cough

No cough at all -0
Occasional hems -1
Mild isolated cough without additional -2
Paroxysmal cough without additional symptoms -3

Severe strenuous cough accompanied by chest discomfort-4

2. Amount of Sputum

Less than 2.5ml/day – 0
2.5-15ml/day – 1
15-25ml/day – 2
More than 25ml/day - 3

3. Throat irritation

No feeling of throat irritation – 0
Occasionally throat irritation – 1
Mild throat irritation – 2
Moderate throat irritation – 3
Severe throat irritation – 4

4. Nasal discharge

No nasal discharge – 0
Sometimes nasal discharge – 1
Often nasal discharge- 2
Continuous nasal discharge

RESULTS AND DISCUSSION

Results of clinical trial were considered in 10 patients with cough. Results are presented after treatment on 7th day, 14th day, 21$^{st\ day}$ and 40th day.

1st visit- 7th day
2nd visit-14th day
3rd visit-21st day
4th visit-40th day

Results of considered symptoms discussed below…

Effect of drug on bouts of cough

Table-1: Effect of drug on bouts of cough (n=10)

Symptom (bouts of cough)	Before treatment	After treatment			
		1st isit	2nd visit	3rd visit	4th visit
Mean	3.6	2.9	2.20	1.7	1.5
Mean reduction	-	0.7	1.40	1.9	2.1
Standard deviation	-	0.316	0.421	0.483	0.527
Standard Error Mean	-	0.100	0.133	0.152	0.166
Df	-	9	9	9	9
Paired “t”	-	4.583	8.573	8.143	7.584
P	-	0.001	0.000	0.000	0.000

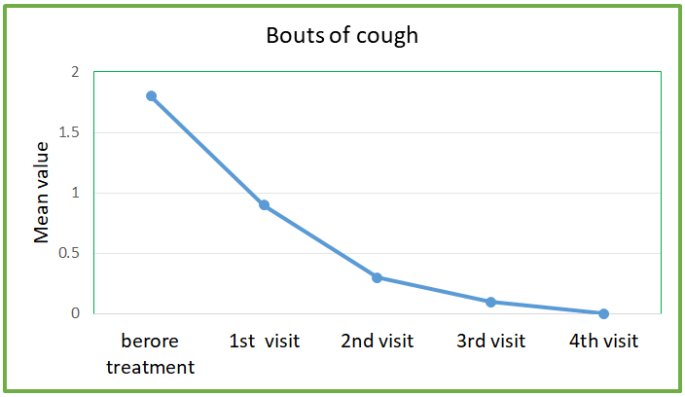

Fig-1: Effect of drug on bouts of cough

Noticeable remission in severity of cough was observed in patients treated with Acalypha indica. Before treatment the average mean of severity of the cough is 3.6. After treatment at last visit on 40th day average mean of severity of cough is reduced into 1.5 P value was 0.001 in 1st visit and 0.000 in other all visits (Table-1 & Figure-1).

Therefore it clearly denoted the Acalypha indica leaves powder is effectiveness on Bouts of Cough.

Effect of drug on expulsion of sputum

Table-2: Effect of drug on expulsion of sputum (n=10)

Symptom (expulsion of sputum)	Before treatment	After treatment			
		1st isit	2nd visit	3rd visit	4th visit
Mean	1.8	0.9	0.3	0.1	0.0
Mean reduction	-	0.9	1.5	1.7	1.8
Standard deviation	-	0.737	0.483	0.316	0.000
Standard Error Mean	-	0.233	0.152	0.100	0.000
Df	-	9	9	9	9
Paired “t”	-	1.417	5.582	6.530	7.216

P	-	0.004	0.000	0.000	0.000

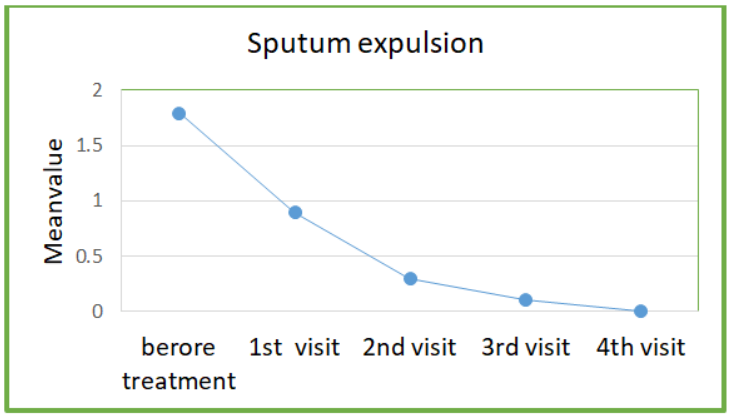

Fig-2: Effect of drug on expulsion of sputum

The amount of sputum reduced in patients treated with Acalypha indica. In before treatment average mean of amount of sputum was 1.8.After treatment at last visit on 40th day the average mean of amount of sputum is reduced into 0.00. P value was 0.004 in 1st visit and 0.000 in all other 3 visits (Table-2 & Figure-2). The reduction of average mean in amount of sputum is indicating that the therapeutic effect of the medicine may be proved by this reduction in the amount of sputum after the treatment.

Therefore it clearly denoted the Acalypha indica seed powder is effectiveness on Amount of sputum.

Effect of drug on throat irritation

Table-3: Effect of drug on throat irritation (n=10)

Symptom (throat irritation)	Before treatment	After treatment			
		1st isit	2nd visit	3rd visit	4th visit
Mean	1.9	1.2	0.4	0.2	0.1
Mean reduction	-	0.7	1.5	1.7	1.8
Standard deviation	-	0.918	0.516	0.421	0.316
Standard Error Mean	-	0.290	0.163	0.133	0.100
Df	-	9	9	9	9
Paired “t”	-	4.583	6.708	6.530	6.194
P	-	0.001	0.000	0.000	0.000

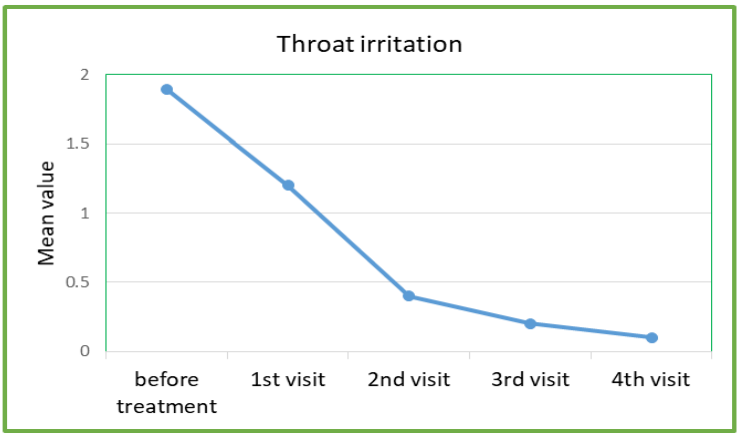

Fig-3: Effect of drug on throat irritation

Noticeable remission in throat irritation was observed in patients treated with Acalypha indica. Before treatment average mean of throat irritation was 1.9.After treatment at 4thvisit on 40th day the average mean of throat irritation reduced into 0.1. P value was 0.001 in 1st visit and 0.000 in all other 3 visits (Table-3 & Figure-3).

Therefore it clearly denoted the Acalypha indica leaves powder is effectiveness on Throat irritation.

Effect of drug on nasal discharge

Table-4: Effects of drug on nasal discharge (n=10)

Symptom (nasal discharge)	Before treatment	After treatment			
		1st visit	2nd visit	3rd visit	4th visit
Mean	1.6	1.0	0.4	0.0	0.0
Mean reduction	-	0.6	1.2	1.6	1.6
Standard deviation	-	0.666	0.516	0.000	0.000
Standard Error Mean	-	0.210	0.163	0.000	0.000
Df	-	9	9	9	9
Paired "t"	-	3.674	4.811	6.000	6.000
P	-	0.005	0.001	0.000	0.000

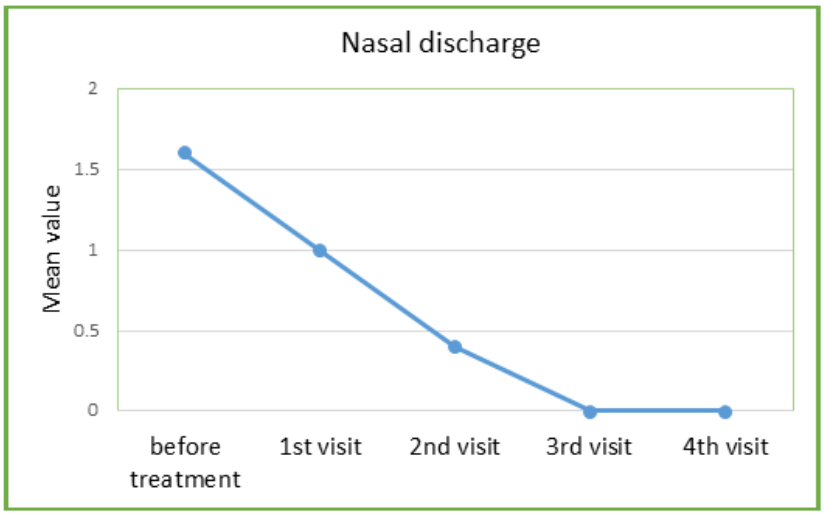

Fig-1: Effects of drug on nasal discharge

Noticeable remission in nasal discharge was observed in patients treated with Acalypha indica. Before treatment average mean of nasal discharge was 1.6.After treatment at 4th visit on 40th day the average mean of nasal discharge is reduced into 0.0. P value was 0.001 in 1st visit and 0.000 in all other 3 visits (Table-4 & Figure-4). Therefore it clearly denoted the Acalypha indica powder is effectiveness Nasal discharge.

Overall effect of Acalypha indica Linn leaves powder on Irumal Noi (cough)

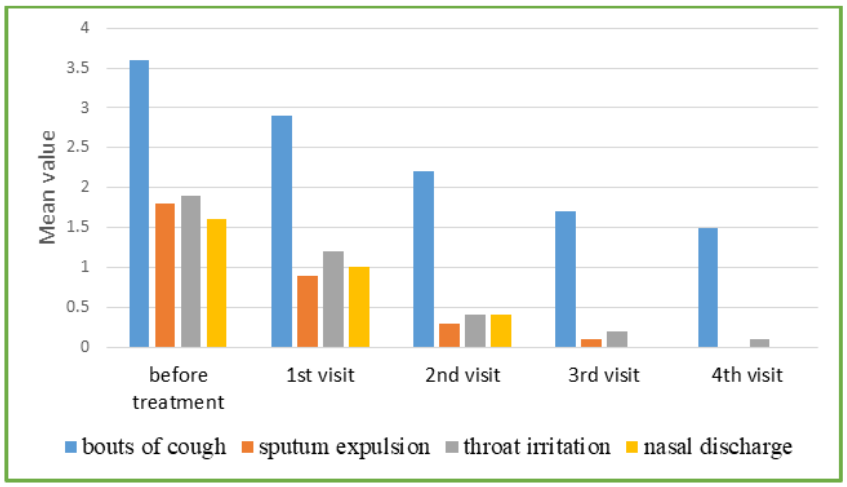

Fig-5: Overall effect of Acalypha indica Linn leaves powder on Irumal Noi

Leaves powder of Acalypha indica reduces the severity of cough is the aim of this study. The results of this study confirmed that upper respiratory tract infection was a usually self-limiting disease with its symptoms improved in the first week of presentation. However, the Acalypha indica L leaves powder used in this study showed it improves symptoms.

Acalypha indica L is a Euphorbiaceous family plant, an annual herb, distributed throughout plains of in India and Ceylon mostly. Roots, leaves and whole plants are used for therapeutic activity. The leaves are laxative, expectorant, emetic, anti-pesticides, analgesics the root has actions of expectorant, emetic. Whole plant has antibacterial and antioxidant

It is a Kapha Rogam. Irumal Noi is characterized by, it is a sound resembling that of the sound arising from tapping of brassy vessel with a hole or it is a sound arising as a result of the throat. It makes a noise ‘’ Kaneerkaneer” [5]. Iruma lNoi is compared with cough in Modern Medicine. Cough is a useful physiological mechanism that serves to clear the respiratory passages of foreign material and excess secretions and should not be suppressed indiscriminately.

The present thesis comprises of seven chapters. Such as Introduction, Literature review, Objective, Methodology, Result, Discussion and Conclusion. Ten patients were registered for this clinical study in Kopalapuram Ayurveda hospital.

The Organoleptic characters of kuppeimeni are Suvai (Taste): Kaippu (Bitter) and Kaarppu (pungent) Veeriyam (Potency): veppu (Hot), Vipaham: Kaarppu [6]. Iya kuttam is responsible for the Irumal Noi, Yugi vaidhya chinthamani, 2005. Kaarppu (Pungent), Thuvarpu (Astringent), Kaippu (Bitter) tastes are balance the aggravated Iyakuttam [1]. The Acalypha indica plant has Kaippu and Kaarppu. So, it’s clearly denotes the Acalypha indica leaves are effectiveness on Irumal Noi.

7.

The triterpenes and steroid were highly presence in the dried whole plant and dried leaves. The presence of tannins was detected in dried whole plant and leaves while alkaloids only present in the dried whole plant. Several studies discovered the presence of alkaloids, saponin and steroids in Acalypha indica as well as other medicinal herbs in India Sciences, 2016 so, it’s clearly denotes the Acalypha indica leaves are effectiveness on Irumal Noi.

CONCLUSION

This is a Quasi experimental study, it concluded that leaves powder of Acalypha indica L in oral administration two times per day 2g with warm water significant decrease in symptoms scores in concordance with improvement in selected individuals in management of IrumalNoi.

The stanza about general character of kuppaimeni (Acalypha indica Linn) in Irumal Noi which is mentioned in Kunapada text book was proved by scientific study.

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