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EFFECT OF SIRUKAN PEELAI (AERVA LANATA) ON KIDNEY STONE

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ABSTRACT

Hard mineral and acid salt deposits that clump together in concentrated urine are known as kidney stones. When they move through the urinary tract, they may cause pain in the side of the abdomen. The primary objective of the research was to assess the impact of Aerva lanata, also known as sirukan peelai, on kindey stone. "The research design selected for the study was quasi experimental non randomized control group design". A non probability convenience sampling techniques was used to obtain sample of 60 patients who satisfied the inclusion criteria. Kidney stone was assessed using ultrasound and pain scale before and after consumption of aerva lanata for experimental group plain water for control group. The average post test score in the experimental group 3.14 (Standard deviation 0.3) was significantly lower than the average post test score in control group 6.32 (Standard deviation 0.5). Unpaired 't' value 7.2926. It shows there is a significant difference found in the posttest scores on the level of pain. Chi square analysis showed that there was no correlation between patients with demographic variables except, smoking habit, habit of alcoholism.

Keywords: Aerva lanata, Kidney stone

INTRODUCTION:

Kidney stone is a prevalent illness that impacts a significant portion of the global population. Around the world, kidney stones affect 12% of people at some point in their lives. Kidney stone prevalence has increased over the past few decades in both

industrialized and developing nations, primarily as a result of sedentary lifestyles, poor eating habits, and concerns about global warming. One in eleven Americans suffer from kidney stones, according to a report, and between 1% and 19.1% of people in Asian nations have kidney stone. In India, for example, kidney stone affects 12% of the population, and half of those affected have kidney failure as a result, primarily from the high cost of treatment. Kidney stones are 6.4% and 6.8% common in China and the United Arab Emirates, respectively. Urinary stone production can be caused by complicated mineral imbalances and electrolyte imbalances that affect other bodily systems, according to current studies.

One of the most prevalent and ancient illnesses of the urinary tract is kidney stones. Numerous studies conducted on humans have indicated that diets high in fruits and vegetables may help prevent kidney stones [1].

Nature has abundantly provided our nation with a vast array of therapeutic plants. For millennia, people have utilized plants as part of a traditional healing system. India makes up 15–20% of the world's 20 000 medicinal plants on the WHO's list [2]. Eighty percent of the world's countries are dependent on medicinal plants, according to the WHO [3].

Numerous pieces of evidence have accumulated to demonstrate the potential of medicinal plants utilized in a variety of traditional systems. Over 13,000 plants have been researched globally in the past several years for a variety of illnesses and disorders [4]. Kidney stones are another serious condition that affects people worldwide. Crystals of calcium oxalate make up to 75% of kidney stones [5].

Medicinal plants are used to stop lithogenesis and lessen kidney stone discomfort. Aerva lanata **(Figure 1)** is a member of the Amaranthaceae family of medicinal plants. It is extensively distributed throughout the world's driest subtropical and tropical regions [6]. The herb is used in traditional medicine to treat urolithiasis, coughs, seizures and headaches. The plant contains various photochemical constituents such as flavanoids, lupeol acetate, benzoic acid, methyl grevillate, lupeol, β-sitosteryl acetate, and tannic acid. Alkaloids include ervoside, aervine, methylaervine, ervine, methylervine, aervoside, and aervolanine. Diuretic, hypoglycemia, anti-inflammatory, antiparasitic, antibacterial, anti-diabetic, hepoprotective, hypolipidemic, anti-urolithiasis, antiasthmatic and antifertility qualities of Aerva lanata have been documented in pharmacological investigations [7].

Figure 1: Aerva lanata

METHODOLOGY:

The impact of Aerva lanata on kidney stone was evaluated using a quasi-experimental non randomized control group design. Using a non-probability convenience sampling technique, 60 kidney stone patients who met the inclusion criteria were gathered. They were picked at random following verbal research information and their consent. Demographic data, including age, education, sex, religion, occupation, income, dietary habits and family history were gathered using a structured interview schedule. Kidney stone was assessed using ultrasound and pain scale before and after consumption of aerva lanata 25g/200ml for experimental group plain water for control group with instructions to consume it every day for 30 days. A daily record sheet was included for keeping track of consumption. The researcher using following tool to identify level of pain through visual analogue scale **(Figure 2)** and size of stone through ultrasound **(Figure 3)**. The analysis done from the data using descriptive and inferential statistics.

Polit and Beck developed the standard scale known as the "visual analogue scale" to measure the intensity of pain. There were 6 categories, and there were a total of 10 potential scores. The calculation and interpretation of each subject score were as follows

An ultrasound is a type of imaging test that creates images of the body's organs, tissues, and other structures using sound waves. Without surgery, it enables medical professionals to view within the body. Sonography or ultrasonography are other terms for ultrasound. Sonograms are another name for ultrasound images.
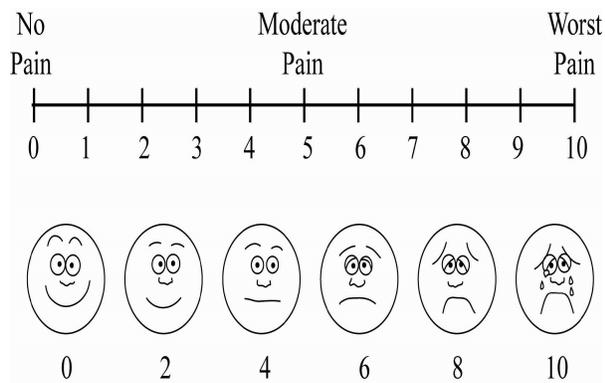
Figure 2: visual analogue scale

Figure 3: Ultrasound

RESULTS:

"A process of organising and synthesising data in such a way that research questions can be answered and hypotheses can be tested" is how Polite and Hungler (1999) defined analysis. Interpretation is the process of interpreting the data and considering the findings' implications in a larger perspective.

Figure 4 shows frequency and percentage distribution of level of pain in experimental group depicts that, in the pretest majority 70% people were in severe pain, 23% were in moderate pain, 7% were in mild pain. Whereas in post test majority 72 % never feels any pain, 11% were in mild pain and 15% were in moderate pain and 2% were in severe pain.

Figure 5 shows frequency and percentage distribution of level of pain in experimental group depicts that, in the pretest majority 53% people were in severe pain, 33% were in moderate pain, 14% were in mild pain. Whereas in post test 18% were in mild pain and 37% were in moderate pain and 45% were in severe pain.

Table 1 shows that the average pre test was 8.23 (Standard Deviation 0.7) and the post test average score is 3.14 (Standard Deviation 0.3). The paired 't' value was 13.15, this shows that there is significant difference between pre test and post test scores on the level of pain among patients with kidney stone. It shows that Aerva lanata consumption has effective in reduction of pain among patients with kidney stone. In the control group mean was 8.78 (Standard Deviation 0.8) and the post test mean score is 6.32 (Standard Deviation 0.5), the paired't' value was 3.22. This shows Aerva lanata was more effective in reduction of pain in kidney stone patients.
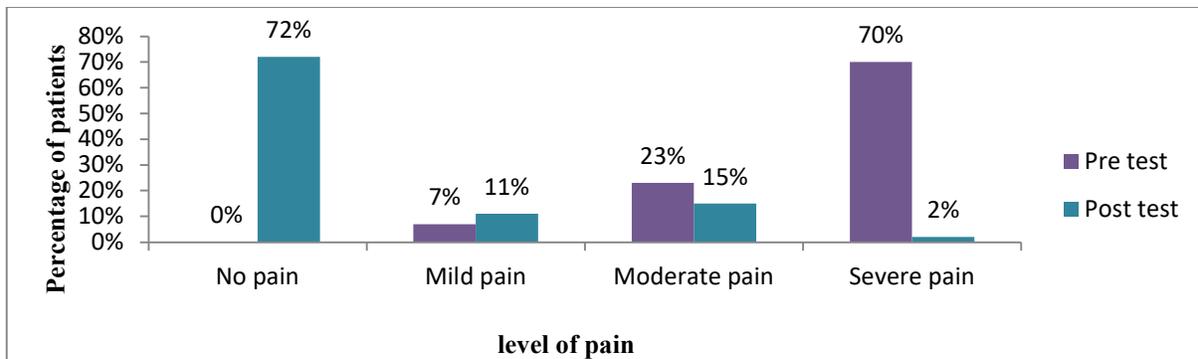
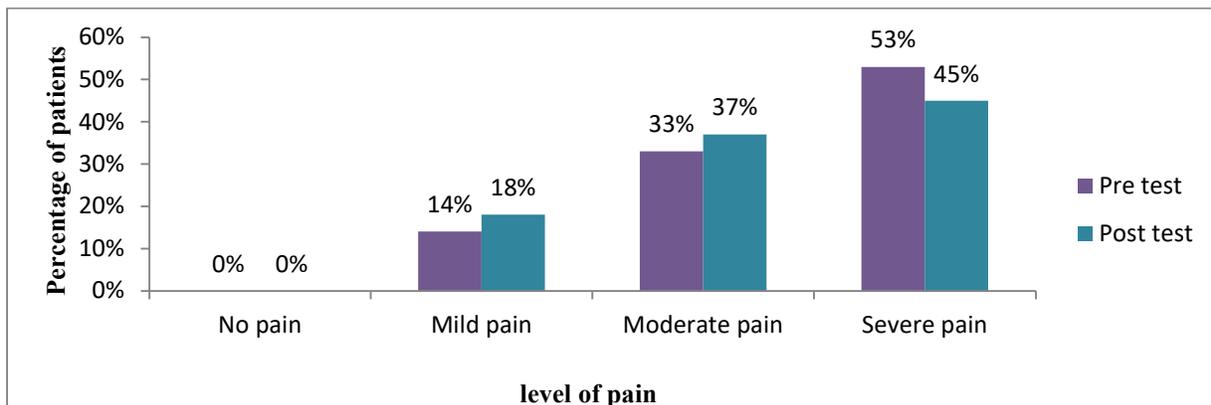**Figure 4: Level of pain among kidney stone patients in experimental group**

Figure 5: Level of pain among kidney stone patients in control group

Table 1: Pre and post test level of pain among kidney stone patients in experimental and control group.

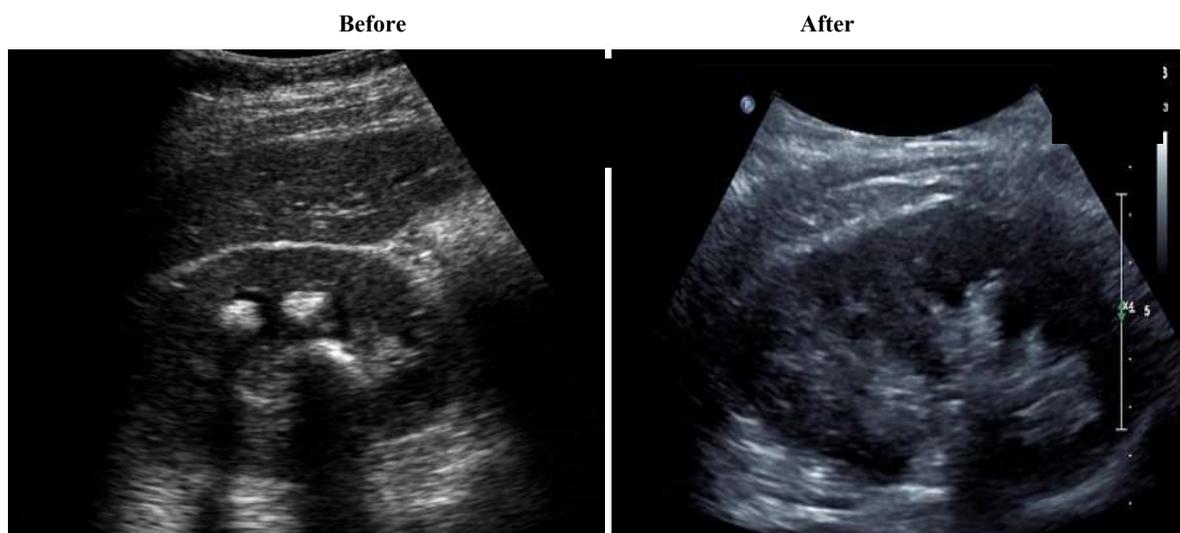| Group	test	Mean	SD	't' value	Table value	Inference
Experimental group	Pre test	8.23	0.7	13.15	2.045	Significant
	Post test	3.14	0.3			
Control group	Pre test	8.78	0.8	3.22	2.045	Significant
	Post test	6.32	0.5			

Before   After

Figure 6: Ultrasound image before and after Aerva lanata consumption (Sample 1)

Table 2: Association between post test levels of pain with their selected demographic variables in experimental group.

S. No	Demographic variables		No pain	Mild	Moderate	Severe	Chi Square Value	Table value	Inference
1	Age	25-30	1	0	2	0	9.8	2.262	S
		30-35	2	1	3	1			
		35-40	2	6	2	2			
		Above 40	0	2	3	3			
2	Education	No-formal education	0	2	1	1	1.2609	2.262	NS
		Primary to high school	2	3	3	3			
		Higher secondary school	1	2	3	2			
		Graduate	0	4	2	1			
3	Occupation	None	0	1	2	1	5.993	2.262	S
		Farmer	2	7	3	2			
		Job	2	3	1	0			
		Business	1	2	1	2			
4	Religion	Hindu	7	6	8	6	1.136	2.262	NS
		Muslim	0	1	1	1			
		Christian	0	0	0	0			
		Others	0	0	0	0			
5	Dietary habit	Vegetarian	6	7	6	8	4.0732	3.182	S
		Non vegetarian	1	0	1	1			
6	Smoking habit	Yes	4	3	3	4	1.5265	3.182	NS
		No	3	10	3	10			
7	Habit of alcoholism	Yes	1	1	1	1	1.296	3.182	NS
		No	3	10	3	10			
8	Family history	History of kidney stone	5	10	3	4	0.2669	3.182	NS
		No history of kidney stone	2	3	1	2			

S-Significant NS-Non significant

Table 2 shows that there was no association between post test level of pain with selected demographic variable except age, occupation and dietary habits.

Table 3: Association between post test levels of pain with their selected demographic variables in control group.

S. No	Demographic variables		Normal	Mild	Moderate	Severe	Chi Square Value	Table value	Inference
1	Age	25-30	0	1	0	1	3.396	2.262	S
		30-35	1	2	2	1			
		35-40	3	3	4	4			
		Above 40	1	2	3	2			
2	Education	No-formal education	0	1	1	1	2.1236	2.262	NS
		Primary to high school	2	3	3	4			

		Higher secondary school	1	3	4	2		
		Graduate	1	2	1	1		
3	Occupation	None	1	2	1	1		
		Farmer	2	3	5	2	2.3347	2.262	S
		Job	1	3	2	1		
		Business	1	1	2	2		
4	Religion	Hindu	7	5	8	7		
		Muslim	0	1	1	1	1.1403	2.262	NS
		Christian	0	0	0	0		
		Others	0	0	0	0		
5	Dietary habit	Vegetarian	7	10	6	4		
		Non vegetarian	0	2	0	1	2.593	3.182	NS
6	Smoking habit	Yes	0	8	2	2	11.42	3.182	S
		No	6	2	5	5		
7	Habit of alcoholism	Yes	0	1	4	1	4.3812	3.182	S
		No	10	4	7	3		
8	Family history	History of DM	3	5	6	4		
		No history of DM	7	1	2	2	8.707	3.182	S
9	Use of medication	Yes	5	10	7	3	1.424	3.182	NS
		No	0	2	2	1		

S-Significant NS-Non significant

Table 3 shows that there was no association between post test level of pain with selected demographic variable except age, occupation, smoking habit, habit of alcoholism and family history

DISCUSSION:

The purpose of the study was to evaluate the effect of Aerva lanata on kidney stone pain. The results of the study indicate that after ingesting Aerva lanata, patients with kidney stones who were in the experimental group significantly differed in their posttest level of pain.

The Basavaraj M. Dinnimath study lends credence to our current investigation. The isolated quercetin and betulin from Aerva lanata have demonstrated mild diuretic and antiurolithiatic effects by significantly reducing the size of calculi in the kidneys and enhancing the excretion of calcium, phosphate, and oxalate while maintaining the level of magnesium, which was reported to be one of the factors inhibiting calculi. His research was conducted at KLEU'S College of Pharmacy, Karnataka [8].

In a study led by P Soundararajan of the Department of Siddha Medicine in Thanjavur, it was found that giving Aerva lanata aqueous suspension (2g/kg body weight/dose/day for 28 days) to CaOx urolithic rats resulted in decreased levels of oxalate synthesising enzymes and decreased kidney crystal deposition markers. The study's findings supported the use of Aerva lanata as a urolithiasis treatment [9].

The results of a study by Mangala Gunatilake at the University of Colombo in Sri Lanka showed that giving rats dried Aerva lanata for

a month had no appreciable impact on their renal function. On the other hand, the proximal convoluted tubular epithelial cells had notable ultrastructural alterations as a result of the same duration of administration **[6]**.

Ankul Singh S of the SRM Institute of Science and Technology, Kattankulathur, conducted a study in which he discovered that the hydro-alcoholic extract of Aerva lanata decreased the development of nephrolithiasis, had a diuretic effect, and was used to encourage the ejection of stones [10].

After administering extracts, Nirmaladevi R from the Avinashilingam Institute for Home Science and Higher Education for Women in Coimbatore observed significantly lower urinary calcium and oxalate when compared to the cystone. This suggests that elevated urinary calcium combined with high urinary oxalate may cause the formation of calcium oxalatestones. Because of this, we were able to determine that the extract had antilithiatic activity **[11, 12]**.

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