

A Study on Siddha Urinary Diagnostic Methodology Neerkkuri and Neikkuri in Adhiratha Azhutham (Hypertension)

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ABSTRACT

Background: In *Siddha* system of medicine, diagnosis of the disease is based on *Ennvagai thervukal* (Eight fold examination), in which *Neerkkuri Neikkuri* (Urine examination) is one among them. It is an effective and sensitive measure for the diagnosis and prognosis of diseases. **Objectives:** This study was conducted to establish the validity of prognostic and diagnostic patterns of *Neikkuri* (Oil on urine sign) in hypertension patients and to assess the association between the *Neikkuri* patterns with respect to pH and specific gravity of urine. **Methods and Material:** Urine samples of 40 diagnosed patients of hypertension aged between 30 to 60 years were collected. Ten healthy volunteers were also selected as control group for comparison. Biochemical analysis was done in the urine samples with urine reagent strip to confirm health status of the subjects. A drop of sesame oil was dropped over 50 ml of each urine sample and behaviour (shape of the oil spread, direction and spread time) was observed. **Results:** Half of the samples of urine of hypertension patients showed circular shape initially and then vacuolating to turn out into a sieve pattern and in remaining others at least a single vacuolation amounting to ring pattern indicative of Pitham were shown. Also, the urine of the hypertension patients were characterised by straw colour and aromatic odour, absence of froth and specific gravity 1.003-1.010. Volume of urine voided ranged from 1-1.5 lit and pH between 5.1-6. In most of the cases the dissemination dynamics of oil drop observed were of slow spreading nature which indicates good prognosis. **Conclusion:** It is concluded that hypertension has got mixed prognosis which may indicate the variation in the amenability of hypertension to the treatment. The study explored the veracity of the investigative procedure in diagnosis and prognosis of hypertension with *Neikkuri* examination.

Key words: Hypertension, *Athiratha Azhutham*, *Neerkkuri*, Urine Examination, Oil on Urine Sign, *Siddha*.

Citation: Fasila Banu S, Parvathy P, Srinivasan V, Ramamurthy M, Elansekaran S, Christian GJ . A Study on Siddha Urinary Diagnostic Methodology *Neerkkuri* and *Neikkuri* in *Adhiratha Azhutham* (Hypertension) . Int J Pharmacol and Clin Sci. 2017;6(1):6-14.

INTRODUCTION

Siddha system is one of the ancient systems of medicine which flourished in South India along with the Dravidian culture. *Siddhars* out of their supernatural wisdom have bestowed to this world many wonderful remedies for myriad type of ailments.^[1] In *Siddha* system the main methodology of diagnosis of the disease is based on *Ennvagai thervu* (*Naadi, Naa, Niram, Mozhi, Vizhi, Malam, Neer (Neerkkuri – Neikkuri) and Sparisam*) according to Sage *Theraiyar*.^[2,3,4] Among these, *Neerkkuri - Neikkuri* is one of the ancient diagnostic tools handled by *Siddhars* which is not used widely nowadays.

Received : 13 -3 -2017 Revised : 28-3-2017;

Accepted : 30-3-2017

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Conflict of interest: Nil ; Source of support : Nil

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DOI : 10.5530/ijpcs.6.1.2

It includes study of its colour, smell, density, quantity and oil drop spreading pattern.^[5-11]

Hypertension is one the most important public health problems nowadays. About 25% of persons in the general population are hypertensive. Hypertension has affected more than 800 million individuals worldwide. The number of undiagnosed patients with hypertension has increased to nearly 33%.^[21-24] This study has explored the possibility of establishing the veracity of the investigative procedure used in the assessment of diagnosis and prognosis of the *Adbiratha azhutham* (hypertension) and to ensure a validated technique made available to *Siddha* Physicians.

MATERIALS AND METHOD

Study setting

This was a prospective observational non randomized controlled trial study, which was carried out in the out patients and inpatients departments of *NoiNaadal* department, Ayothidoss Pandithar Hospital, National Institute of *Siddha*, Tambaram Sanatorium, Chennai. The duration of the study was one year (2011 -2012). The study was conducted after the Institutional Ethical Committee clearance (No. NIS/6-20/Res/IEC/10-11). Normal treatment procedures in National Institute of *Siddha* were followed and the data collections from the patient were kept confidential. Informed consent was obtained from the patient prior to the enrolment. This study involved only the performing investigations mentioned in the protocol. Appropriate measures were taken to prevent infection.

Criteria for inclusion

Hypertensive patients of age between 30 - 60 years, both male and female having blood pressure $\geq 140 / > 90$ mmHg consistently have been included in the study.^[13-23]

Criteria for exclusion

Hypertensive patients with serious complications associated with any other systemic diseases were excluded.

Study enrolment

Patients were informed about the study and a written consent was obtained for this study. A total of 100 subjects (80 hypertensive cases and 20 healthy, non-hypertensive subjects) were screened from the Out patients and Inpatients departments. Based on the inclusion criteria, a total number of 40 hypertensive patients were included

and 10 healthy volunteers were selected as control group for comparison. Thus, we had two groups, one for hypertension and second for healthy group.

Evaluation of Clinical parameters

Complete clinical history, complaints, duration and examination findings were recorded in a prescribed format in the history and clinical assessment forms separately. *Siddha* parameters such as seven body components (*udal thatbukekal*),^[6] three humours (*mukentram*),^[6] and eight fold examination (*ennvagaithervu*) were assessed. Radial arterial pulse (*Naadi*) was examined through the three fingers of the physician on wrist of the patient and felt for the strength of Vatham, Pitham and Kapham. The pulse appraisal, pulse character and pulse play were assessed. Vatham is felt in the index finger, Pitham in the middle finger and Kapham under the ring finger. According to *Siddha*, the normal ratio of these three naadis are supposed to be 1: 1/2: 1/4 for vatham, pitham and kabham respectively. If two naadis are elevated together, then it was noted as vatha pitham, pitha vatham and kaba pitham.

Naa (Tongue) was examined for appearance, color, taste and salivary secretion. Patient's complexion (*Niram*) and voice (*Mozhi*) were examined. Eyes (*Vizhi*) were examined for color of the sclera and lacrimal secretion. The warmth of the body, sweating and presence of pain were assessed by touch (*sparisam*). Stool (*Malam*) was examined for its color, odor and consistency. Urine (*Moothiram*) was examined for color, odor, frothiness, density, quantity and deposits.^[7,8] Wrist circummetric sign (*Manikkadai nool*),^[2] Habitat (*Nilam*), Season (*kaalam*),^[1] and Astrology (*Sodbidam*) were also documented.

Conventional investigations such as complete haemogram, Fasting Blood Sugar (FBS), post prandial blood sugar (PP), urea, creatinine, lipid profile and alkaline phosphatase were estimated in blood. Urine was tested for its colour, leucocytes, urobilinogen, pH, blood, specific gravity, and glucose, ketones, bilirubin and protein nitrite. Dip-stick test reactions using urine reagent strips (Uro dip 10 A - ERBA diagnostics, Germany) were observed and recorded. Motion test, chest X ray, ECG and Echocardiogram were also done^[13-17,22-24].

Neikkuri (oil on urine sign)

To reduce the dietary influence on urine formation and to avoid the influence of inequality in duration of sleep on urine quality, every patient was advised to sleep early (before 9 pm) with usual intake of water during the dinner. The diet was balanced with appropriate proportion of all

six tastes. Early in the morning, the patients were asked to collect the mid-stream urine of the first urination of the day in a clean and neat bottle. Urine thus collected was poured in a round wide mouthed glass bowl (capacity of 200 ml), kept on a flat surface and was allowed to stand. After ascertaining that the urine was still and devoid of disturbance or ripples or other influences of the wind, then it was examined in a day light in morning.^[2,5] Sesame oil (It was procured from mill as freshly ground sesame seeds in traditional stone grinder (chekku) without any additives added) was then taken in a dropper and a drop of oil was instilled over the surface of urine gently (keeping a distance of 3 cm above the surface of the urine) without disturbing / touching the surface. It was then left for a few minutes and the oil drop spreading pattern on the urine surface was observed.^[19-21] The observations were then recorded and photography was taken. 5 slides of picture were taken – 1 minute after dropping of oil, after 3 minutes, after 5 minutes, after 7 minutes and after 10 minutes.

Statistical Analysis

All collected data were entered in to computer using MS Access/ MS Excel Software. The data were analysed using STATA Software under the guidance of Senior Research Officer (Statistics), National Institute of *Siddha*. The level of significance were 0.05. Descriptive analysis were made. The Statistical analysis for the significance of different diagnostic *Neerkkuri-Neikkuri* were done using Student 't' test and chi-square test for quantitative and qualitative data respectively.

RESULTS

Out of the 80 cases screened, 40 hypertensive cases were included and among 20 normal subjects screened, 10 normal subjects were included for this study. Table 1 shows 15% of cases falling in the age group of 30-40 years, 32.5% of cases in the age group of 41-50 years and 52.5% of cases in the age group of 51-60 years. Table 1 shows 60% of cases were female. 67.5% of cases had the *Naadi nadai* of *Vatha pitham*, 27.5% cases had *Pitha vatham* and 5% of cases had *Kaba pitham*. Most of the cases had *Vatha pitha Naadi*. *Ratha pitha disease* is said to be associated with *Vatha pitha Naadi*.^[1, 2, 5]

Table 1 shows among the cases, the colour of the urine was colourless in 2.5%, straw coloured in 72.5%, yellow coloured in 22.5% and dark yellowish in 2.5%. In most of the cases, the colour of the urine observed was of straw colour. It also shows that, the odour of urine was aromatic

in 55%, ammoniacal in 30% and putrid in remaining 5% odour. Among the cases, froth of the urine was absent in 87.5% and the remaining 12.5% presented with froth in the urine. Table 1 shows that 5% of cases passed 500ml -1lit of urine per day, 87.5% of cases passed 1.1 to 1.5 lit per day and the remaining 7.5% of cases passed 1.6-2 lit per day. Table 1 shows, the specific gravity of the urine were between 1.003-1.010 in 62.5%, 12.5% had specific gravity between 1.011-1.015, 22.5% had specific gravity between 1.016-1.020 and 2.5% had specific gravity between 1.021-1.025. Among the cases, 37.5% of cases had pH between 5.1-6, 35% of cases had pH between 6.1-7 and remaining 27.5% of cases had pH above 7.

Table 2 shows that in most of the cases, with the coin shaped *Neikkuri* pattern, they had pH between 6.1-7. Table 3 shows in sizable number of cases, with the coin *Neikkuri*, had specific gravity of their urine between 1.003-1.010. Table 4 shows that there is a moderate correlation between systolic blood pressure and pH value. There was also a correlation between diastolic blood pressure and pH value. But there was no correlation between systolic and diastolic blood pressures with specific gravity.

Table 5 shows in most of the cases, oil drops were of slow spreading nature which indicates good prognosis. Table 6 shows in most of the cases the shape of *neikkuri* observed were of vacuolated sieve and vacuolated. According to sage *Theran*, the ring pattern in *neikkuri* are said to be associated with the *pitham* humour in urine.^[5] For a *neikkuri* shape to take a ring pattern there needs to be a large vacuole to fill in the spreaded expanse of the instilled oil drop. So vacuole of a larger form is predominantly presumed to be because of *pitham* in the urine.^[5, 2] *Theran* also stated that the smaller vacuoles presenting as a constellation and appearing like a sieve is because of *kabam*.^[5] *Kabam* when blends with the *pitham*, the larger vacuoles become smaller and make the *neikkuri* pattern to look like a sieve, which according to Sage *Gowthamar*, is indicative of bad prognosis.^[1, 2, 5, 9]

Plate 1 shows in Day 1- In most of the cases, the shapes of the *neikkuri* patterns observed in 3, 7 and 10 minutes were of coin and circular shapes (Figure 1-7). Plate 2 shows in Day 2 - In most of the cases, the shape of the *neikkuri* observed in 3, 7 and 10 minutes were of coin and circular shapes. Plate 3 shows in Day 3 - In most of the cases, the shape of the *neikkuri* observed in 3, 7 and 10 minutes were of coin, egg and circular shapes.

Plate 4 and plate 5 shows about the *Neikkuri* patterns of urine in the pH ranging between 5.1 – 7 and above, were of coin shapes till 7 minutes of observation. In 10 minutes

Table 1: Distribution of clinical parameters of the study sample

Clinical parameter	No of patients	Percentage	
Age	30-40 years	6	15
	41 -50 years	13	32.5
	51-60 years	21	52.5
Sex	Female	24	60
	Male	16	40
Kaalam (Season)	Vaatha Kaalam	2	5
	Pitha Kaalam	38	95
Naadi(Pulse)	Vatha pitham	27	67.5
	Pitha vatham	11	27.5
	Kapha pitham	2	5
Colour	Urine		
	Straw colour	29	72.5
	Yellow	9	22.55
	Dark yellow	1	2.5
	Colourless	1	2.5
Odour	Aromatic	22	55
	Ammoniacal	16	40
	Putrid	2	5
	Specific gravity	1.003-1.010	25
1.011-1.015		5	12.5
1.016-1.020		9	22.5
1.021-1.025		1	2.5
Froth	Present	5	12.5
	Absent	35	87.5
Volume	500 ml-1 lit	2	5
	1.1-1.5 lit	35	87.5
	1.6-2 lit	3	7.5
pH	5.1-6	15	37.5
	6.1-7	14	35
	Above 7	11	27.5

Table 2:Coin Neikkuri pattern in different pH

SI.No	Different pH	Number of Cases	Percentage
1	5.1-6.0	5	29.4%
2	6.1-7.0	8	47.1%
3	Above 7	4	23.5%

circular and mitre shaped patterns (Figure 2) were observed.

Plate 7 shows in most of the cases, the shapes of *Neikkuri* observed in samples with specific gravity 1.003-1.010 at 3 minutes (48%), 7 minutes (36%) and 10 minutes (28%) were of coin shape. Plate 8 shows the *neikkuri* observed

Table 3 : Coin Neikkuri pattern in different specific gravity

SI No	Different Specific gravity	Number of Cases	Percentage
1	1.003-1.010	12	70.5%
2	1.011-1.015	2	11.8%
3	1.016-1.020	1	5.8%
4	1.021-1.025	2	11.8%

Table 4: Mean (±) Standard deviation

Group	Systolic Pressure	Diastolic Pressure	pH	Specific gravity
0	122±4	80±0	6.1±0.5	1.009 ± 1.003
1	150±8	97±4	6.5±0.8	1.012 ± 1.004
2	169±18	110±7	6.7±0.7	1.011 ± 1.004
Total	149±19	96±11	6.5±0.7	1.011± 1.004

Group 0 : Systolic 120 – 130 and diastolic 80

Group 1 : Systolic > 140 to < 170 or / and Diastolic> 90 to < 100

Group 2 : Systolic >170 or / and Diastolic > 100

Table: 5 Statistical analysis between blood pressure and spreading nature of oil in urine

SI.No	Neikkuri	Number of samples	Percentage
1	Slow spreading pattern	84	70%
2	Fast spreading pattern	36	30%
Total		120	100%

Table 6: According to formation of vacuolation

S.no	Vacuolation Patterns	Number of cases	Percentage
1	Vacuolated sieve	20	50%
2	Vacuolated	11	27.5%
3	Single vacuole	4	10%
4	Non vacuolated	5	12.5%
5	Total	40	100%

in samples with specific gravity 1.011-1.015 at 3 minutes (40%) were of coin shape, 7 minutes (40%) and 10 minutes (40%) were of egg shape.

Plate 9 shows in specific gravity 1.016-1.020 group, *Neikkuri* shape in 3 minutes were of coin, circular, bear face, seed,

shield, tortoise and white chowry shapes. 7 minutes-bird shape (Figure 1) and 10 minutes were of human face shape. Plate 10 shows the *neikkuri* pattern observed in samples with specific gravity 1.020-1.025 at 3 minutes (67%) and 7 minutes (18.2%) were of coin, animal and tortoise shell shapes. In 10 min were of coin, tortoise and miter shapes. (Figure 4,5,6)

Plate 11 shows group 1, most of the cases, the shape of the *neikkuri* observed in 3, 7 and 10 minutes were coin, circular, egg, disc, human face, lotus leaf, mountain and white chowry shapes. Plate 12 shows group 2, in which most of the cases, the shape of *neikkuri* observed in 3 minutes, 7 minutes and 10 min were of coin, circular, egg, white chowry and bird. Plate 13 shows *Neikkuri* results in normal subjects/ healthy volunteers. In all the cases, the urine samples were of straw coloured, aromatic in odour and the voided urine volume ranged between 1.1 to 1.5 lit/day, pH between 5.1 to 6 and specific gravity 1.003 – 1.010. The result obtained were within normal limits. Plate 14 shows in most of the cases, the shape of the *neikkuri* observed on Day 1, 2 and 3 in 3 minutes, 7 minutes and 10 minutes were of coin and circular shapes. Plate 15 shows in most of the cases with pH range between 5.1-6 and 6.1-7 shape of *neikkuri* observed in 3 and 7 min were

of coin shape.

Plate 16 shows in most of the cases with specific gravity range between 1.003-1.010 and 1.011-1.015 shape of *neikkuri* in 3 minutes and 7 minutes with coin shaped.

In most of the cases, the shape of the *neikkuri* observed in 3 minutes, 7 minutes and 10 minutes were of coin and circular and jasmine bud shapes.^[5,9] Differentiation could be made between the *neikkuri* pattern in normal subjects and the study samples of hypertension on close and continued observation. In control group of normal subject's samples, no vacuolated sieve pattern was observed. Hence, it may be construed that it is the *pitham* that is responsible for the vacuole formation in *neikkuri* patterns (Figure 7). And in hypertension, *pitham in ratbam* or blood is excreted in the urine as well,^[5] which could be the manifestation of vacuolated sieve patterns in *Neikkuri* examination of hypertension patients.^[2,3,4,5]

DISCUSSION

Neerkkuri and *neikkuri* are very sensitive and exclusively *Siddha* methods of diagnostic urine examination



Figure 1: In Day 1 – Bird shape.



Figure 2: In Day 2 – Pearl shape.



Figure 3: In Day 3 – Miter shape.



Figure 4: In Day 1 - Ring shape.



Figure 5: In Day 2–Coin shape.



Figure 6: In Day 3 –Bottle gourd shape.



Figure 7: Formation of vacuoles in Neikkuri sign.

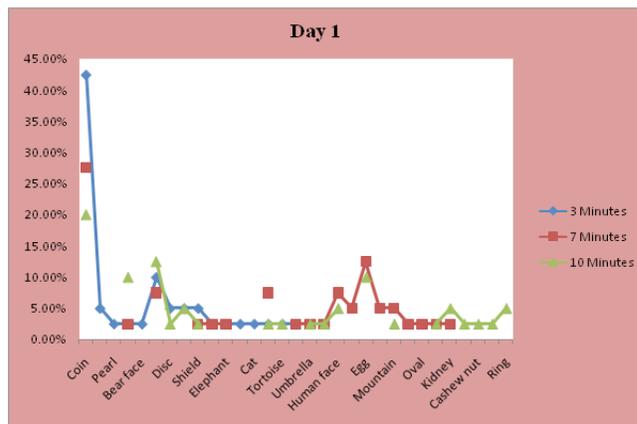


Plate 1: Different patterns of Neikkuri observed in day 1.

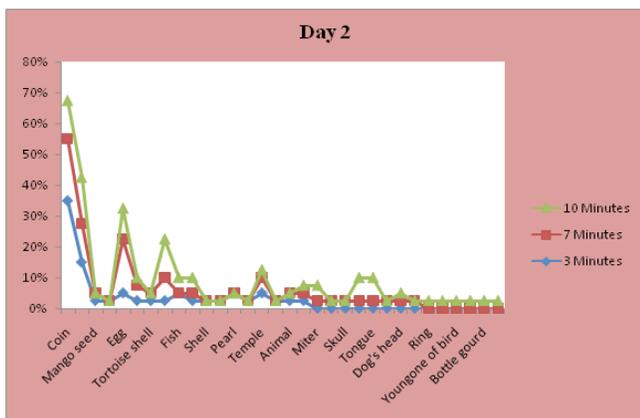


Plate 2: Different patterns of Neikkuri observed in day 2.

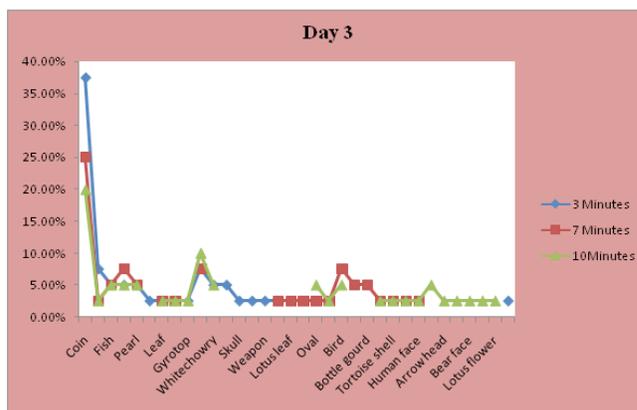


Plate 3: Different patterns of Neikkuri observed in day 3

propounded by sage *Theraiyar*.^[2,3,4,5] This is an efficient method in elucidating the prognosis of the given disease. In this controlled study, the *Neikkuri* of hypertension urine showed the characteristics of pitham manifesting as expanding of oil drop in circular fashion initially and then vacuolating to turn out in to a sieve pattern in half of the patients and in remaining others at least a single vacuolation amounting to ring pattern indicative of pitham, particularly

showing up in urine. The urine of the hypertension patients were characterised by straw colour, aromatic odour, absence of froth and specific gravity 1.003-1.010. Volume of urine voided ranged from 1-1.5 lit and pH between 5.1-6. In most of the cases the dissemination dynamics of oil drop observed were of slow spreading nature which indicates good prognosis.^[2,3,4,5]

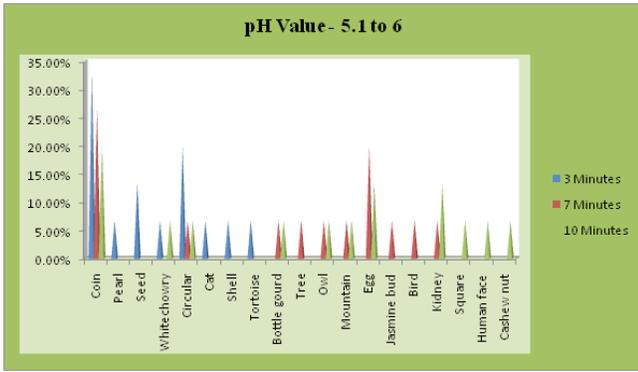


Plate 4: Neikkuri patterns according to pH value: 5.1 to 6.

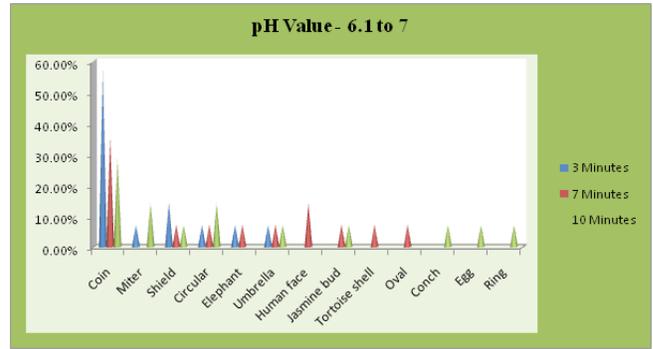


Plate 5: Neikkuri patterns according to pH value: 6.1 to 7.

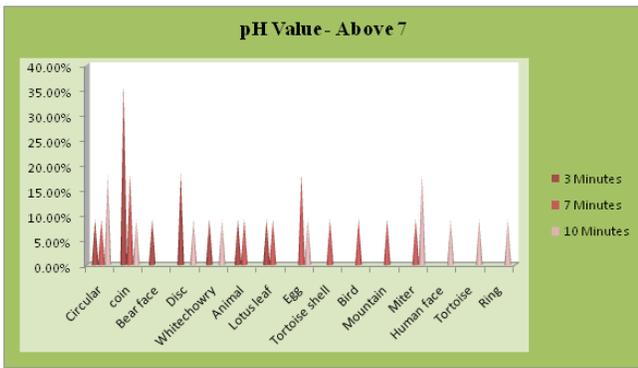


Plate 6: Neikkuri patterns according to pH value: Above 7.

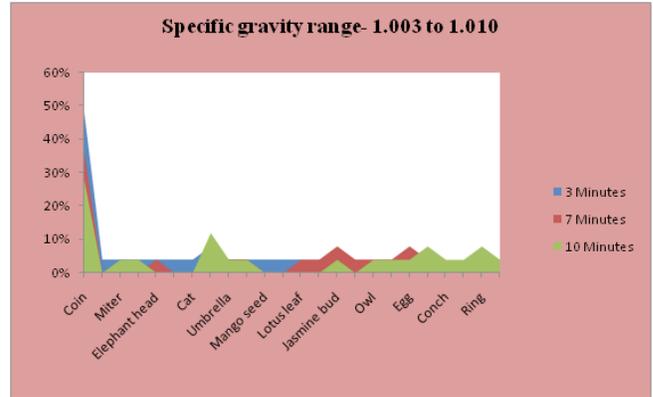


Plate 7: Neikkuri patterns according to specific gravity range: 1.003 to 1.010

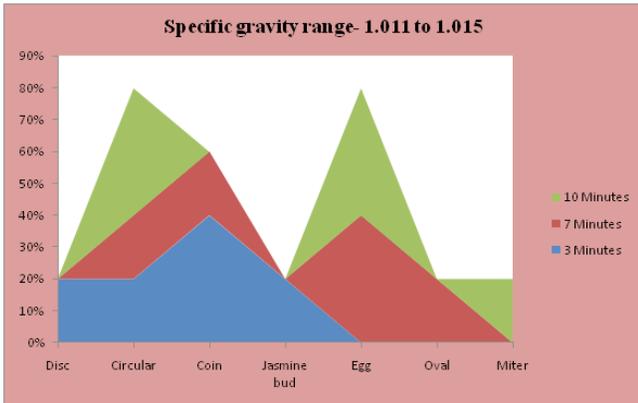


Plate 8: Neikkuri patterns according to specific gravity range: 1.011 to 1.015.

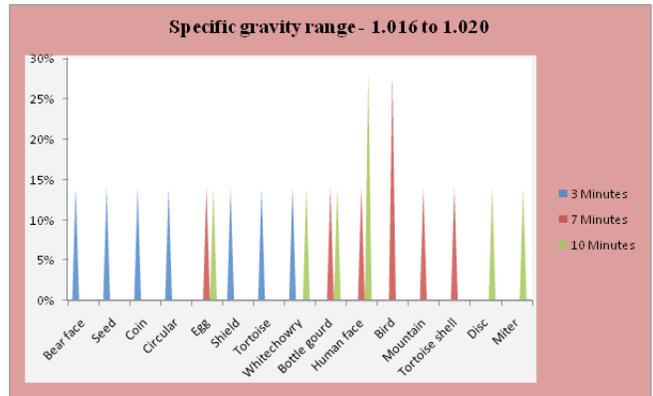


Plate 9: Neikkuri patterns according to specific gravity range: 1.016 to 1.020

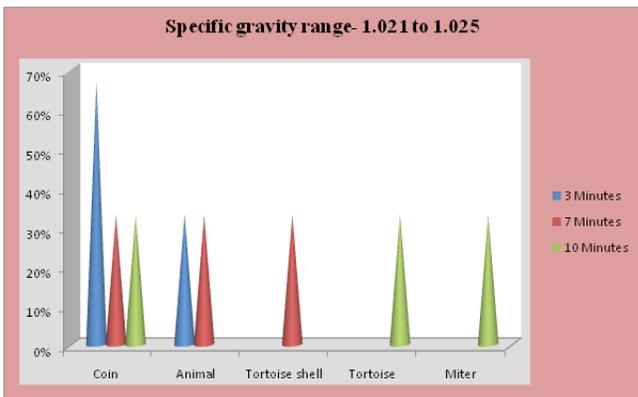


Plate 10: Neikkuri patterns according to specific gravity range: 1.021 to 1.025

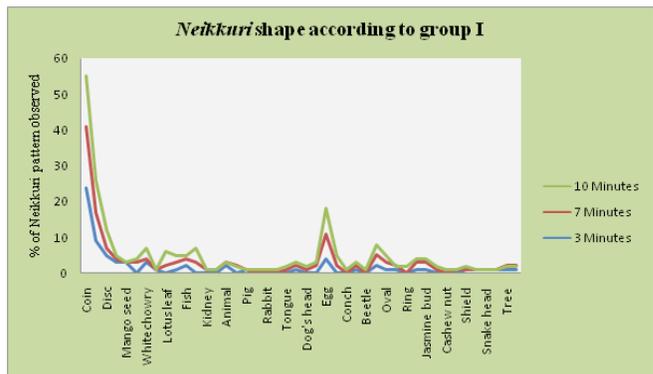


Plate 11: Different patterns of Neikkuri observed in Group I (Systolic >140 <170 or/and Diastolic >90 <100)

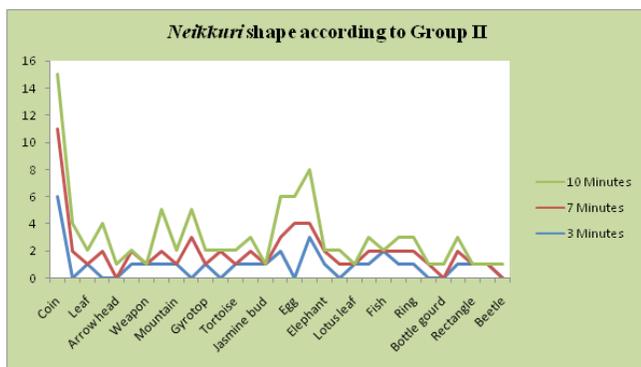


Plate 12: Different patterns of *Neikkuri* observed in Group II (Systolic >170 or/and Diastolic >100)

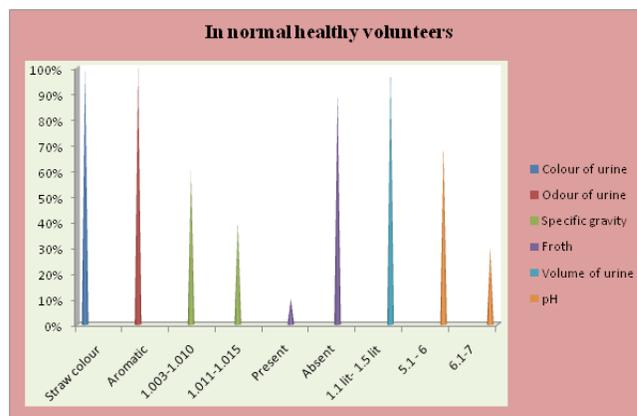


Plate 13: Results in normal healthy volunteers.

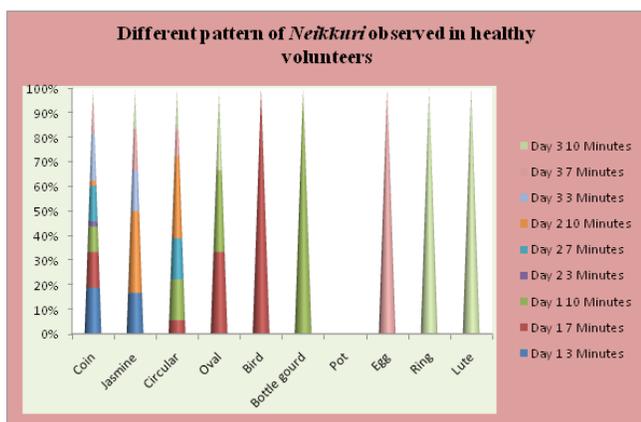


Plate 14: *Neikkuri* pattern observed in normal healthy volunteers.

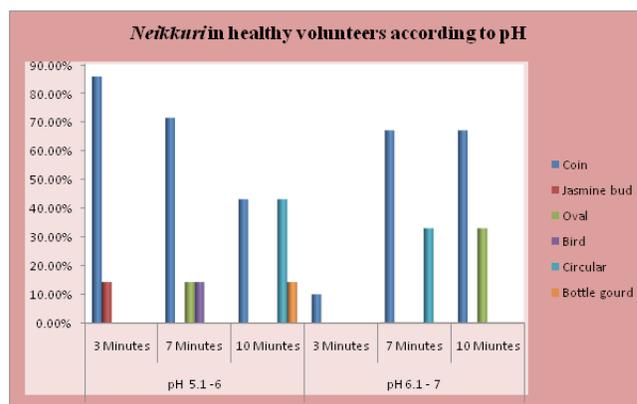


Plate 15: *Neikkuri* in healthy individuals according to pH.



Plate 16: *Neikkuri* in healthy individuals according to specific gravity.

CONCLUSION

From this study, it can be concluded that the hypertension has got mixed prognosis, as indicated by slow spreading, straw coloured urine and vacuolation, which may indicate the variations in the amenability of hypertension to the treatment. Studies like this may through new light to standardize the *Neerkkuri* and *Neikkuri* examination methods.

ACKNOWLEDGEMENT

Special thanks to the Director, National Institute of Siddha and Senior Research Officer (Statistics), National Institute of Siddha for providing facility to carry out the work.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

ABBREVIATION USED

MS: Micro Soft.

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