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ASSESSMENT OF PROGNOSTIC ASPECTS OF SHIRASHOOLA (HEADACHE) BY TAILA BINDU PARIKSHA

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ABSTRACT

Indian traditional medicine has a great history which describes about the ways to remain healthy, diagnostic methods of diseases, their treatment and prognosis in detail. For proper diagnosis of diseases, Ayurveda has advised to examine patient's different patho-physiological aspects through several methods like *Ashtasthana, Dashavidha,DvadashavidhaPariksha* mentioned under*Roga-RogiPariksha*. *MutraPariksha,* mentioned under *AshtasthanaPariksha,*is an ancient method of urine examination. In the Ayurvedic classics, there is no direct description of methodology to ascertain the prognosis of *Shirashoola* (headache).*TailaBinduPariksha,* which is a part of *MutraPariksha*is used ascertain the prognosis of diseases. International Headache Society (IHS) has developed aHeadache intensityscale (HIS)which helps doctors and research scholars to assess the intensity of Headache so that they may easily ascertain the functional capacity of a patient and the progress of disease.An open study was undertaken on a single group of 90 headache patients and were subjected to *TailaBinduPariksha.*The HIS score was also assessed and compared with shape and direction of spread.In majority of the patients, the correlation was found statistically highly significant. *TailaBinduPariksha*may be used as an alternative method to ascertain the prognosis of headache patients.

Keywords: Ayurveda, *TailaBinduPariksha, Shirashoola,* Headache Intensity scale

INTRODUCTION

Headache is among the most common reason for which patient seek medical intervention. It is responsible for more disability than any other neurological problem. Despite regional variations, it is a worldwide problem affecting people of all ages, races, status and geographical areas. Globally, it has afflicted about 50% adults.[1]Migraine is very highly prevalent in South India (the mean global prevalence is estimated as 4.7%).[2] The GLOBAL BURDEN OF DISEASE STUDY (GBDS 2010) found tension type headache and migraine to be 2nd and 3rd most prevalent disorders worldwide.[3]Headache can be a sign of stress, emotional distress,anxiety or depressionor it can eventually emerge as a consequence of a medical disorder like migraine or high blood pressure. It is of two types – Primary and Secondary headache. Primary headaches are stand-alone ailmentscaused directly by the overactivity or problems associated with pain sensitive structures in the head (blood vessels, muscles, and nerves of the head and neck) in the absence of an underlying pathologic condition, disease or traumatic injury. They may also result from changes in chemical activity in the brain. Some Primary headaches can be triggered by lifestyle factors

like overconsumption of alcohol or processed meat, altered sleep pattern, poor posture, skipped meals, stress etc. This category includes Cluster Headache, Migraine, New daily persistent headache and Tension headache. Secondary headaches are symptoms caused by the stimulation of pain-sensitive nerves ofhead caused by another underlying pathology like vascular diseases, hypertension, infection, medication overuse, sinus congestion, constipation, trauma, malignancy, stress, anxiety, depression, strain of eye, neck etc..The International Headache Society (IHS) also categorizes headache as Primary, when they are not caused by another condition, or Secondary, when there is an underlying cause.Recently, few models have been developed to aid in prognostication of headache. Headache Intensity scale [4]given by IHS is used by the doctors and research scholars to assess the intensity of headache so that they may easily ascertain the functional capacity of a patient and the progress of a disease.This scale is categorized into 8 grades starting from a no pain condition to an excruciating headache.

In Ayurveda, there is no direct description of methodology to ascertain the prognosis of *Shirashoola* (headache).*TailaBinduPariksha*(oil drop test), which is a part of *MutraPariksha*(urine examination)is an ancient method which was popularly used during 16th century AD[5][6][7] to ascertain the prognosis of diseases.This simple,cheap and non-invasivemethod has been described in severalAyurvedic texts of medieval period like VangasenaSamhita, Vasavarajiyam, Yogatarangini, Yogaratnakara etc. It is also described in Siddha system of Medicine. In this technique a small drop of sesame oil is placed on the surface of first morning urine sample and features of the drop (rate, direction and shape of spread) were observed. These parameters are indicative of disease prognosis. A circular/oval or semicircular shape indicate healthy status of the person. A linear /irregular shape with may projections indicate

bad prognosis.In this present study, it is expected that as Primary headaches,devoid of any underlying etiology are reversible, so shape of spread should be circular, oval or semicircular. Similarly, the shape of spread in Secondary headache cases having some underlying etiology should be linear/circular with many projections/irregular. This indicates bad prognosis.

As nowadays, *TailaBinduPariksha*is not specifically used, there is a need to re-establish its utilityand to furtherserve our future diagnostic and prognostic needs.

Material and method

For this open study, 90 patients of headache (primary and secondary type) were registered from the Neurology ward (Modern Medicine wing) and Ayurveda wingof Hospital. A detailed clinical history was taken and relevant physical examinations and biochemicaltests were done and recorded in a predesigned proforma. HIS(Headache Intensity Scale) scoring was done to ascertain the prognosis. Urine sample was collected from the patient in morning and the experiment was done within one and half hours. This study was approved by the Institutional Ethics Committee (No. 2018-19/351 dated 02.01.2018). A written informed consent was obtained from all the registered patients.

Inclusion criteria

Provisionally diagnosed cases of headache (primary and secondary type), of all age and sex were randomly selected from the Neurology ward (Modern Medicine wing) and Charaka ward (Ayurveda wing) of S.S Hospital, BHU after due written informed consent of the patients.

Exclusion criteria

Trauma induced Headachecases were excluded from this study.

TailaBinduPariksha

TailaBinduPariksha was done as per the standardized method in the previous study conducted by Reetu Sharma *et al*.[8]

Requirements:

a. *Patra* (testing container): A round shaped glasspetridish having diameter of atleast 8 inches and height of 1 cm. (Fig.1)
b. *Taila* (oil): *Krishna TilaTaila* (black sesame oil).
c. Container for collection of urine sample: A plastic, wide mouth, disposable, airtight container made up of polypropylene.
d. Background: Black background paper with grid placed below the petri dish(for clarity in photography).
e. A stopwatch to record time. (Fig.1)
f. A magnetic compass to observe the direction of spread. (Fig.1)
g. Recorder: Video clips were taken by Sony camera W220 (7.2 mega pixels) and analyzed in a computer with VLC media player.
h. Collection of urine sample:First morning urine sample (midstream) was collected.
i. Labeling of samples: The sample was labeled with the abbreviation depicting the patient ID along with the date of experiment**.**
j. Place: The recordings were done in the Clinical Laboratory (IM), where natural sunlight was easily available. Special precaution was taken so that the spread remain unaffected by wind, dust or any other disturbing factors.
k. Time of experiment: Early morning (within one and ½ hoursof urine collection).
l. Volume of urine: 200-250 ml of urine sample which should fill ¾th of Petri dish to allow the spread of oil drop.(Fig.1)
m. Size of sesame oil drop: 12 µl through a micropipette. (Fig.2)
n. Height of the oil drop from the surface of urine was fixed to maximum 1 cm from the surface of urine.
o. Petri dish was washedby placing it in chromic acidfor 24 hours and then washing it with tap water first followed by rinsing it with distilled water. It was reused after drying it in oven.

Fig. No.1: Volume of Urine in Petri dish with a stopwatch and magnetic compass kept in the side

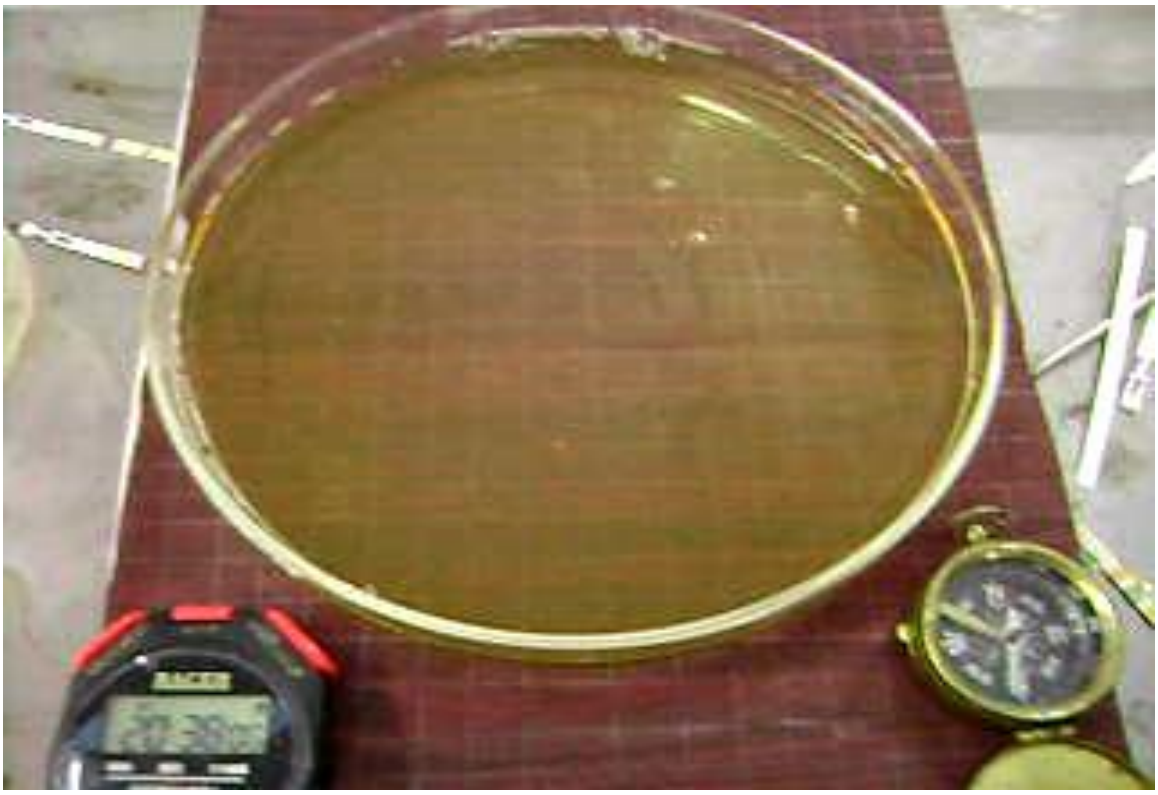
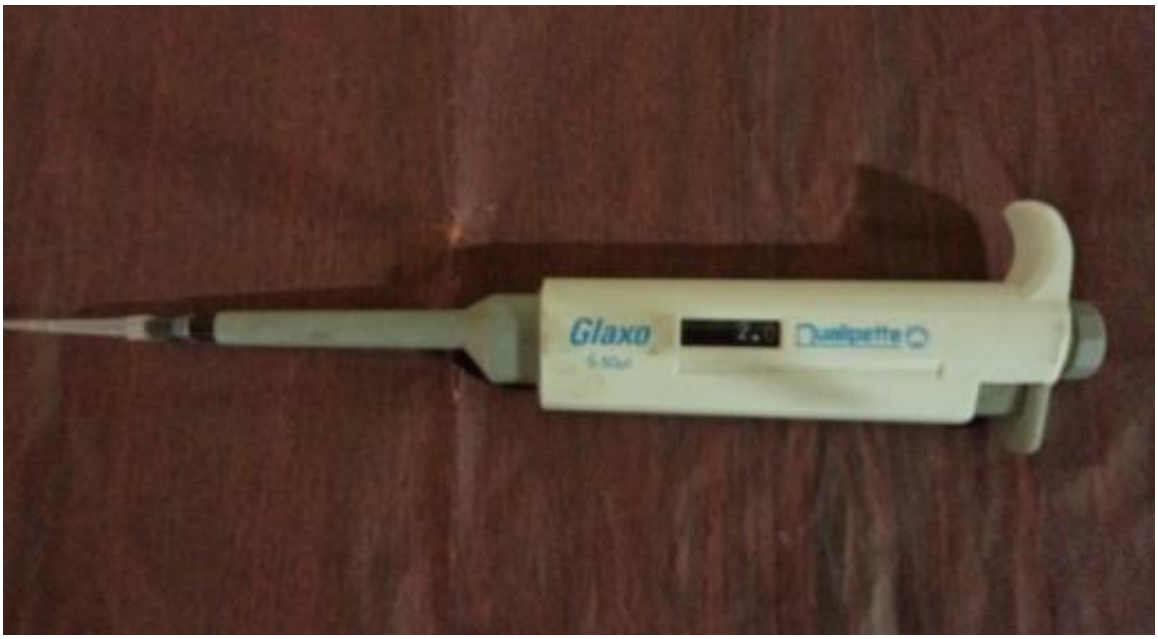


Fig. No.2: Micropipette



Procedure

This procedure has been standardized in the Department of VikritiVigyan in collaboration with Department of Biophysics, Faculty of Medicine, I.M.S, B.H.U, Varanasi. The test was performed within one and half hours of collection to get the accurate results. About ¾th part of the Petri dish was filled with urine. When the urine surface becomes calm, 12 µl oil was dropped through a Pasteur's micro pipette on the center of urine surface from a maximum height of around 1 cm. The spreading pattern, direction, final shape after complete spread were observed for interpretation of results. After full spread of oil drop, photographs were taken and margins of oil film were sketched out digitally (on computer) to make the shape more conspicuous. Direction of spread of oil drop was recorded by magnetic compass.

Criteria for assessment

Assessment of TailaBinduPariksha

After deeply analyzing various shapes of oil drop formed in *TailaBinduPariksha*as described in the Ayurvedic texts, it was concluded that circular or oval shape of spread indicates good prognosis whereas a linear, irregular or circular shape with many projections indicates bad prognosis.[9]

1. **GRADE VI**- Excruciating pain –Intense pain make it Impossible to stay in bed or at rest, frenetic, partly bizarre behaviour. Occasionally, on the border of self-mutilation, or even exceeding it.
2. **GRADE V A** – Severe (with prostration) – Patient lie in the horizontal position in a dark quiet room due to throbbing pain and profuse vomiting. 'Shutting out the external world', declining any nutrition; absolute quietude, all in an attempt to avert an exacerbation.
3. **GRADE V B** – Severe (without prostration) - Patient bedridden, whole time or part time, but lack special circumstances mentioned in category VA.
4. **GRADE IV** – Moderate – Inhibits daily activities but doesn't prohibit daily activities, it may or may not be present during bed rest, analgesics are required, reduced ability to work due to reduction in tempo and efficacy. Procrastination is absent.
5. **GRADE III** – Mild – It may inhibit daily activities, analgesics may be required sometimes, reduced ability to work due to reduction in tempo and efficacy, isolation tendency with reduced thriving. Procrastination is present.
6. **GRADE II** - Heaviness/discomfort - Presence of (a) procrastination, (b) reduction of thriving, and (c) isolation tendency, in spite of more or less complete ability to work in regular work. At least one of these traits should be present to satisfy this criteria.
7. **GRADE I** - Minimal unpleasantness- A person may notice slight headache only when he concentrates on it and not when his mind is occupied with reading, watching television, etc. Social functions are uninfluenced, inclusive of regular work. There is no procrastination.
8. **GRADE 0** – No pain.

Statistical analysis

Statistical analysis was done by using IBM-SPSS for windows software (version 16.0). It was performed by applying descriptive statics, Chi-square test, $P < 0.05$ was considered as significant and $P < 0.001$, $P < 0.01$ as highly significant.

Observation and Results

Types of headache

Out of 90 headache patients, 35 were found to have Primary headache and the rest 55 had Secondary headache. On applying Chi-Square between Primary and Secondary headache patients for their frequency, value came as 4.444, p-value = 0.035(S), which was statistically significant.

HIS grading system

In Primary headache patients, none belonged to grade zero, 5 patients each belonged to grade I and grade III, 10 patients belonged to grade II, 4 patients belonged to grade IV, 8 patients belonged to VA grade, 2 patients belonged to VB grade and 1 patient belonged to grade VI.

In Secondary headache patients, none belonged to grade zero and grade I, 1 patient belonged to II grade, 7 patients belonged to III grade, 20 belonged to grade IV, 7 patients belonged to grade VA, 13 patients belonged to grade VB and 7 patients belonged to VI grade.

On applying Chi-Square between Primary and Secondary headache patients for their frequency in HIS grading system, χ^2 value came as 24.765 and p-value was less than 0.001 which is statistically highly significant. [Table 1] Chi square has been calculated after merging the grades suitably so that the expected frequency in each cell is greater than 5.

Table No.1: Frequency of Primary and Secondary headache cases in HIS grading system

S.No	HIS grading	Primary headache cases (n= 35)	Secondary headache cases (n=55)
1	0	0 (0%)	0 (0%)
2	I	5 (14%)	0 (0%)
3	II	10 (29%)	1 (2%)
4	III	5 (14%)	7 (13%)
5	IV	4 (11%)	20 (36%)
6	VA	8 (23%)	7 (13%)
7	VB	2 (6%)	13 (23%)
8	VI	1 (3%)	7 (13%)
	Total	35 (100.0%)	55 (100.0%)
χ^2 = 24.765, p-value< 0.001 (HS)			

*HIS: Headache Intensity Scale, χ^2: Chi square value, p-value: probability value, HS: Highly significant

Shape of oil drop in *TailaBinduPariksha*

In headache patients, out of 90 cases, 44 cases showed circular shape, 42 cases showed irregular shape and 4 cases showed dot shape of oil drop in urine with no spread. Out of 35 cases of Primary headache, 32 cases showed circular shape and 3 cases showed irregular shape. Out of 55 cases of Secondary

headache, 12 cases showed circular shape and 39 cases showed irregular shape and 4 cases showed no spread at all. On applying Chi-Square between Primary and Secondary headache patients for shape of *TailaBindu*, χ^2 value came as 41.477 and p-value was less than 0.001 which is statistically highly significant. [Table 2]

Table No.2: Observation on shapes and direction of *TailaBindu* in Primary and Secondary headache cases

Features of oil drop		**Primary headache cases (n=35)**	**Secondary headache cases (n=55)**	**Total**
Shape of oil drop	Circular	32 (91.42%)	12 (21.81%)	44 (48.88%)
	Irregular	3 (8.57%)	39 (70.91%)	42 (46.66%)
	Dot	0 (0%)	4 (7.27%)	4 (4.44%)
	Total	35 (100.0%)	55 (100.0%)	90 (100.0%)
χ^2 = 41.477, p-value< 0.001 (HS)				
Direction of oil drop	Non-uniform	3 (8.57%)	39 (70.91%)	42 (46.66%)
	Uniform	32 (91.42%)	12 (21.81%)	44 (48.88%)
	No spread	0 (0.0%)	4 (7.27%)	4 (4.44%)
	Total	35 (100.0%)	55 (100.0%)	90 (100.0%)
χ^2 = 33.395, p-value< 0.001 (HS)				

*χ^2: Chi square value, p-value: probability value, HS: Highly significant

Comparison between shape of *TailaBindu*and HIS grading in Primary and Secondary headache cases

Out of 35 cases of Primary headache, the shape of spread of oil drop in 32 cases were circular (i.e. 5 cases of grade I, 10 cases of grade II, 5 cases of grade III, 4 cases of grade IV, 5 cases of grade VA, 2 cases of grade VB and 1 case of grade VI) and3 cases of grade VA showed irregular shape (i.e. all 3 cases of grade VA). [Table 3]

Out of 55 cases of Secondary headache, the shape of spread of oil drop in 12 cases were circular (i.e 1 case of grade II, 5 cases of grade III, 3 cases each of grade IV and grade VA showed 39 cases were irregular (i.e 2 cases of grade III, 17 cases of grade IV, 4 cases of grade VA, 11 cases of grade VB and 5 cases of grade VI) and 4 cases showed no spread at all (i.e 2 cases each of grade VB and grade VI). [Table 3]

Table 3:Showing observations on grading of Primary and Secondary headache cases and shape of *TailaBindu*

Shape of spread		**HIS grade**								**Total**
		0	**I**	**II**	**III**	**IV**	**VA**	**VB**	**VI**	
Primary headache (n=35)	**Circular**	0	5	10	5	4	5	2	1	32
	Irregular	0	0	0	0	0	3	0	0	3
	Dot	0	0	0	0	0	0	0	0	0
Total		0	5	10	5	4	8	2	1	35
Secondary headache (n=55)	**Circular**	0	0	1	5	3	3	0	0	12
	Irregular	0	0	0	2	17	4	11	5	39
	Dot	0	0	0	0	0	0	2	2	4
Total		0	0	1	7	20	7	13	7	55

*HIS: Headache Intensity Scale

Direction of oil drop in *TailaBinduPariksha*

In headache patients, out of 90 cases, 42 cases showed non-uniform spread, 44 cases showed uniform spread and 4 cases showed no spread of oil drop. Out of 35 cases of Primary headache, 3 cases showed non-uniform spread and 32 cases showed uniform spread of oil drop. Out of 55 cases of Secondary headache, 39 cases showed non-uniform spread, 32 cases showed uniform spread and 4 cases showed no spread at all. On applying Chi-Square between Primary and Secondary headache patients for direction of *TailaBindu,* χ^2 value came as 33.395 and p-value was less than 0.001 which is statistically highly significant. [Table 2]

Comparison between direction of *TailaBindu*and HIS grading in Primary and Secondary headache cases

Out of 35 cases of Primary headache, the direction of spread of oil drop in 32 cases were uniform (i.e 5 cases each of grade I, grade III and grade VA, 10 cases of grade II, 4 cases of grade IV, 2 cases of grade VB and 1 case of grade VI) and 3 cases of grade VA showed non-uniform spread of oil drop in *TailaBinduPariksha*. [Table 4]

Out of 55 cases of Secondary headache, the direction of spread of oil drop in 12 cases were uniform (i.e 1 case of grade II, 5 cases of grade III, 3 cases each of grade IV and VA), 39 cases were non-uniform (i.e 2 cases of grade III, 17 cases of grade IV, 4 cases of grade VA, 11 cases of grade VB and 5 cases of grade VI) and 4 cases showed no spread of oil drop in *TailaBinduPariksha* (i.e 2 cases each of grade VB and VI). [Table 4]

Table 4:Showing observations on grading of Primary and Secondary headache cases and direction of *TailaBindu*

Direction of spread		HIS grade								Total
		0	**I**	**II**	**III**	**IV**	**VA**	**VB**	**VI**	
Primary headache	**Uniform**	0	5	10	5	4	5	2	1	32
	Non-uniform	0	0	0	0	0	3	0	0	3
	No spread	0	0	0	0	0	0	0	0	0
Total		0	5	10	5	4	8	2	1	35
Secondary headache	**Uniform**	0	0	1	5	3	3	0	0	12
	Non-uniform	0	0	0	2	17	4	11	5	39
	No spread	0	0	0	0	0	0	2	2	4
Total		0	0	1	7	20	7	13	7	55

*HIS: Headache Intensity Scale

During the follow up of these 4 cases, it was found that all these patients could not survive for more than 2 days from the date of collection of their urine samples. Eventually, two of them died on the same day.

Discussion

In *TailaBinduPariksha,* features of the drop like shape and direction of spread are parameters indicative of the prognosis of diseases. A circular/oval or semicircular shape and uniform spread of oil drop indicates good prognosis whereas linear/circular shape with many irregular projections and non-uniform or diagonal spread indicate bad prognosis. As observed in this study, out of 90 cases of headache, 35 were found to have Primary headache and the rest 55 were found to have Secondary headache. On applying Chi-Square between Primary headache and Secondary headache patients for the frequency of types of headache patients, value was found to be statistically significant. Overall, 44 cases showed circular shape with uniform spread, 42 cases showed irregular shape with non-uniform spread and 4 cases showed no spread at all. Out of 35 cases of Primary headache, 32 cases showed circular shape of *TailaBindu*having uniform spread (i.e. 5 cases each of grade I, III and VA, 10 cases of grade II, 4 cases of grade IV, 2 cases of grade VB and 1 case of grade VI) and3 cases of grade VA showed irregular shape with non-uniform spread. Out of 55 cases of Secondary headache, 12 cases showed circular shape of *TailaBindu*having uniform spread (i.e 1 case of grade II, 5 cases of grade III, 3 cases each of grade IV and VA), 39 cases showed irregular shape with non-uniform spread (i.e 2 cases of grade III, 17 cases of grade IV, 4 cases of grade VA, 11 cases of grade VB and 5 cases of grade VI) and 4 cases showed no spread at all (i.e 2 cases each of grade VB and grade VI). A highly statistically significant difference in HIS grade, shape and direction of *TailaBindu* was found between Primary and Secondary headache groups. Comparatively, the frequency of Primary and Secondary headache cases was more in lower and higher grades on HIS scale respectively. Also, the shape and direction of *Tailabindu* in Primary headache cases were mostly circular and uniform respectively whereas in Secondary headache cases, they were mostly irregular and non-uniform respectively. Herein, it satisfies our initial assumption that Primary headache cases should have a good prognosis as it is reversible in nature without having any underlying etiology whereas Secondary headache should have a bad prognosis as it has an underlying etiology and hence is difficult to cure. Also, 4 Secondary headache cases which showed no spread indicate grave prognosis *(Asadhya).* During the

follow up of these 4 cases, it was found that all these patients could not survive for more than 2 days from the date of collection of their urine samples. Eventually, two of them died on the same day. Hence, it can be said that the assessment by HIS criteria for severity matches with the assessment by the features of *TailaBinduPariksha*.

It can be concluded that, HIS score can easily assess the functional capacity of the headache patients and prognosis of the disease. As the result is statistically significant, *TailaBinduPariksha* may be used as an alternative method to assess the prognosis and severity of the headache to plan its treatment further. The circular shape and uniform direction observed in highly significant number of cases of Primary headache indicates good prognosis whereas the irregularity in shape and variation in direction was observed in statistically highly significant number of cases of Secondary headache indicating that they had a tendency towards bad prognosis. On correlation with the HIS score, the features of *TailaBinduPariksha* gave a statistically highly significant result in assessing the prognosis of headache. This technique may also be used as a prognostic marker in headache patients by observing the features in both Primary and Secondary type of headache. Since no laboratory test is available to instantly assess or forecast the prognosis of the diseases, this cheap and simple method may prove to be a useful technique in this field.

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Conflicts of interest

There are no conflicts of interest.

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