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Evaluation of Siddha Diagnostic Methods for Meganeer Avathaigal with the Aid of Conventional Diagnostic Methods



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R. Ramya¹, G.J. Christian², S. Elansekaran³, M. Ramamurthy³ and V. Srinivasan³

1PG Scholar, Department of Noi Naadal, National Institute of Siddha, Tamilnadu, India

2HOD(i/c), Department of Noi Naadal, National Institute of Siddha, Tamilnadu, India

3Lecturer, Department of Noi Naadal, National Institute of Siddha, Tamilnadu, India.

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ABSTRACT

The traditional system will be more appropriate if the disease is diagnosed by its own perspective. So the study aims at determining the sensitivity and specificity of the Siddha diagnostic methodology for Meganeer avathaigal (a complication of diabetes mellitus). Applying Siddha system of diagnosis with inclusion and exclusion criteria, clinical study was conducted on persons having the disease meganeer avathaigal. The procedures namely Wrist circummetric sign, oil on urine sign and 8 fold examination namely Pulse, Tongue, Complexion, Voice, Eye, Body examination, Stool and Urine were used for the study. Odds ratio with 95% confidence interval was used for statistical analysis. Most patients had the wrist circumference of 9 ½ Finger units and an insignificant number of patient's urine, drop of oil took the form of slowly spread. Similarly, 8 fold examinations revealed most patients had pulse play with *pitham vatham* than healthy volunteers. Tastelessness and decreased salivation were observed in tongue examination. Increase in body temperature and pain on palpation were found in a significant number of patients. Patient's urine samples had fruity odor, higher in density and polyuria. So it can be concluded that the following Siddha procedures in combination namely *Wrist circummetric sign, oil on urine sign* and *8 fold examinations* differentiate the patients of meganeer avathaigal from the healthy volunteers.



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1. INTRODUCTION

Siddha system is an ancient system of Medicine practiced prominently mostly in southern parts of India^[1]. Siddha diagnosis is based on patient's symptomatology and its correlation with human body type. The system also states that the Human body is made up of three physical constituents Vatham, Pitham and Kapham. These three elements are part of the environment and formed by the combination of the five basic elements.

Vatham is formed by combination of air and space, a force of creation. Pitham is formed by fire, a force of preservation. Kapham is formed by earth and water, a force of destruction. These formations indicate this universe and the human body are made of five elements. The three elements Vatham, Pitham and Kapham in the ratio 4:2:1 is called as the Life Forces and is explained in pathinen siddhar nadi sasthiram^[2]. Indian system and western system of medicine are based on different sets of logical axioms and are difficult to identify precise correspondences between related disease entities. Siddha diagnosis is unique in individualization with respect to locating the vitiation of three humors of an individual's constitution and not generalized^[3, 4, 5, 6]. Sage Yugi classified diseases mainly based on signs and symptoms and three humors. Siddha diagnosis also reveals the prognosis of the condition.

In the classical Siddha scripts, different diagnostic procedures and symptoms for various diseases are mentioned. Pathinen Siddhar Nadi Nool^[7] explains the method of measuring wrist circummetric sign and the interpretation of different measurements. Also, the procedure of spreading pattern of oil on urine and interpretation of the results is clearly briefed in Agathiyar and Theraiyar^[8].

Eightfold examinations, a kind of systemic examination^[9], includes examining the pulsation, tongue, complexion, Voice, eye, examination of body for temperature and locating pain, stool and Urine.

The present study was planned to validate the diagnostic procedures of Siddha system to diagnose Meganeer avathaigal with the aid of conventional clinical diagnostic procedures. Meganeer avathaigal (a condition of chronic glycosuria with the complications). In the scripts of Siddha, the disease is the result of increased pitham.

The following procedures, taken for the study namely Wrist circummetric sign, Oil on urine sign and eightfold examinations were considered for this study. The treatment in traditional system will be more valid if the disease is diagnosed by its own perspective. So the present study was carried out to validate the Siddha diagnostic procedure for Meganeer avathaigal.

2. MATERIALS AND METHODS

2.1. Selection of patients

A total number of 25 diagnosed patients of Diabetes mellitus with complications were randomly chosen for this study with the selection criteria. Twenty five healthy volunteers were also selected for comparison. For this purpose, 200 patients were screened from the outpatient of Noi Naadal Department of Ayothidoss Pandithar hospital of National Institute of Siddha, Tambaram Sanatorium, and Chennai-47.

2.2. Criteria for inclusion

Age between 20 years to 60 years, having blood sugar range of more than 140 mg% (fasting) and more than 200 mg% (postprandial), Polyuria, foot ulcer, dermatitis, oligospermia, gastroenteritis. Among these criteria, at least four out of eight were considered for selection.

2.3. Criteria for exclusion

Age below 20 years and above 60 years, serious complications associated with any other systemic diseases.

2.4. Study enrollment

Patients were thoroughly told about the study and a written approval was obtained for this study. Demographic data, complaints and duration, signs, symptoms, laboratory parameters were recorded in a case record form.

2.5. Clinical parameters

Modern diagnostic parameters applied for screening the patients were complete haemogram, blood sugar (Fasting and Postprandial), HbA1c, urea, creatinine, lipid profile (to know the systemic illness).

2.6. Wrist circummetric sign

To measure the wrist circumference in finger units, the patient was asked to keep his left hand's four fingers just below the right thumb, then the doctor measured the circumference of the right wrist just below four fingers of the left hand of the patient using a twine, then the twine was removed from the wrist and placed on a plain surface and the measurement of the twine was taken by the patient's

2.7. Shape of oil drop on urine

To avoid inaccuracy, every patient was advised to had dinner before 9 pm. at early morning (4am-6am) patients were asked to collect the first urination of the day in a clean container then urine was poured in a round glass bowl, kept on a flat surface and is allowed to settle.

After confirming that the urine is stable, the urine was examined in daylight. *Sesame oil* was then taken in a dropper and one drop of the oil was dropped over the surface of urine slowly (keeping a distance of 1 mm from the surface of the urine to the lower end of the oil drop) without disturbing the surface. It was then left for a few minutes, and the oil drop spreading pattern on the urine was observed. The inferences were then recorded.



2.8. Eightfold examination

Pulse 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 first finger, Pitham in the middle finger and Kapham under the ring finger. Tongue was examined for appearance, color, taste and salivary secretion. Patient's complexion and voice were examined. Eyes were examined for color of the sclera, lacrimal secretions. The warmth of the body, sweating and presence of pain were assessed. Stool was examined for its color, odor and consistency. Urine was examined for color, odor, frothiness, density, quantity and deposits.

2.9. Ethical Issues

This study was approved by institutional ethical committee. F. No.NIS/6-20/Res/IEC/13-14 dated 17/1/2014.

2.10. Statistical analysis

Results of the clinical parameters were expressed as mean \pm SD. Data obtained from Siddha system of diagnosis for patients and healthy volunteers was analyzed using Chi-Square statistics followed by Fisher's exact test for p-value calculation. Odds ratio and 95% confidence interval (CI) were used to distinguish the patient from healthy individuals ^[11]. Data was computed for statistical analysis using the Graph pad prism software. Difference between the data was considered significant at $p < 0.05$.

3. RESULTS

The clinical parameters used for screening the Meganeer avathaigal are given in Table 1, where healthy volunteers were taken for comparison. Total count, Lymphocytes, erythrocyte sedimentation ratio, fasting and postprandial blood glucose, VLDL and triglyceride were higher than the normal healthy volunteers.

TABLE 1: Clinical Picture of Meganeer Avathaigal Patients and Healthy Volunteers

Sr. No.	Lab parameters	patients	Healthy volunteers
1	Hb	12.65 \pm 2.10	13.32 \pm 1.57
2	TC	7607.46 \pm 1389.32	8170.64 \pm 1787.92
3	Polymorph	57.49 \pm 8.91	61.51 \pm 5.12
4	Lymphocyte	35.63 \pm 7.78	32.01 \pm 5.61
5	Eosinophil	8.19 \pm 2.309	4.70 \pm 2.15
6	ESR ½ an hr	8.19 \pm 2.30	4.19 \pm 2.48
7	ESR 1 hr	18.99 \pm 29.32	10.19 \pm 4.84
8	FBS	137.7 \pm 40.39	80.95 \pm 8.46
9	PPBS	225.5 \pm 60.82	114.20 \pm 13.29
10	Bl urea	19.8 \pm 4.10	18.25 \pm 4.05
11	Sr creatinine	0.79 \pm 0.08	0.7 \pm 0.1
12	Total cholesterol	176.9 \pm 37.91	171.43 \pm 29.92
13	HDL	38.0 \pm 5.72	37.28 \pm 3.77
14	LDL	87.68 \pm 25.03	89.93 \pm 19.67
15	VLDL	24.93 \pm 12.34	26.34 \pm 17.89
16	Tgl	127 \pm 57.55	123.93 \pm 57.71

Note: N =25, Values are in mean ±SD.

Table 1 shows Out of 25 cases, Statistical analysis of ESR revealed that significant number of patients having raised levels($p < 0.0001$). FBS, PPBS findings of the patients having significant number of raised levels ($p < 0.0001$).

Table 2 shows the results of wrist circummetric sign examination. In this study, most of the patients were having the wrist circumference of 9 ½ finger units. Odds ratio for the patients having the wrist circumference of 9 ½ finger unit is 95% CI 2.05-54.95, $p < 0.004$, whereas significant number of healthy volunteers were having the wrist circumference of 10 finger units $p < 0.01$, Odds ratio 0.0133(0.0007-0.243).

TABLE 2: Outcome of the Manikadai Nool Examination of Meganeer Avathaigal Patients and Healthy Volunteers

Sr. No.	Wrist circumference	Patients(n=25)	Healthy volunteers(n=25)	Odds Ratio with 95% CI
1	8	1	1	1.00(0.059-16.92)
2	9	2	3	0.72(0.110-4.733)
3	9 ¼	2	2	1.00(0.059-16.92)
4	9 ½	12	2	10.614(2.05-54.95)
5	9 ¾	8	2	5.411(1.017-28.792)
6	10	0	15	0.0133(0.0007-0.243)

Table 3 shows the results of shape of oil drop on urine examination. Significant number of patient`s urine, the drop of oil took the form of the oil drop took the form of slow dispersion ($p < 0.004$) odds ratio 10.615 95% CI (2.05-54.95).

TABLE 3: Outcome of Shape of Oil Drop on Urine Examination of Meganeer Avathaigal Patients and Healthy Volunteers

S.No	Shape of oil on Urine	Patients(n=25)	Healthy volunteers(n=25)	Odds Ratio with 95% CI
1	Vegamai paraval	3	5	0.54(0.115-2.58)
2	Mella paraval	12	2	10.615(2.05-54.95)
3	Salladaikan	6	3	2.315(0.508-10.54)
4	Muthu	2	4	0.456(0.075-2.755)
5	Aravu	0	2	0.184(0.0084-4.041)
6	Oval	0	4	0.0937(0.0048-1.840)
7	Round	2	5	0.3478(0.060-1.99)

TABLE 4: Outcome of Eight Fold Examination of Meganeer Avathaigal Patients and Healthy Volunteers

S.No	Variables	Patients(n=25)	Healthy volunteers(n=25)	Odds Ratio with 95% CI
1.NAADI	Naadi panbu			
	Kalatthal	21	4	27.562(6.0756 - 125.03)
	Azhunthal	2	2	1.00(0.129-7.717)
	padutthal	2	19	0.027(0.0050-0.152)
	Nadi nadai			
	Vali Azhal	2	20	0.0217(0.0038-0.124)
	Azhal Vali	20	5	16.00(4.001-63.976)
	Iyya Vali	1	0	3.122(0.121-80.395)
	Vali Iyyam	2	0	5.425(0.247-118.96)
2.NAA	Thanmai			

	Maa padithal	8	4	2.47(0.634-9.62)
	Vedippu	1	1	1.00(0.0591-16.92)
	Iyalbu	16	20	0.44(0.124-1.591)
	Niram			
	Karuppu	3	2	1.56(0.238-10.30)
	Iyalbu	20	23	0.347(0.060-1.993)
	veluppu	2	0	5.425(0.247-118.96)
	Suvai			
	Kaippu	2	0	5.425(0.247-118.96)
	Inippu	3	0	7.93(0.388-162.07)
	Loss of taste	2	0	5.425(0.247-118.96)
	Normal	15	25	0.028(0.0016-0.529)
	Vai neer ooral			
	Increased	0	0	0
	Decreased	18	0	125.80(6.75-2343.42)
	Normal	7	25	0.0079(0.0004-0.1481)
3.SPARIAM				
	Veppam			
	Mitham	24	25	0.3203(0.0124-8.246)
	Migu	0	0	0
	Thatpam	1	0	3.12(0.121-80.395)
	viyarvai			
	Normal	21	25	0.0937(0.0048-1.840)

	increased	4	0	10.674(0.543-2098.656)
	Thanmai			
	Thodu vali	10	0	34.54(1.888-631.96)
	Udal varatchi	4	0	10.674(0.543-209.65)
	Iyalbu	11	25	0.0156(0.0009-0.283)
4.NIRAM				
	Karuppu	23	23	1.000(0.129-7.717)
	Manjal	0	0	0
	Veluppu	2	2	1.000(0.129-7.717)
5.MOZHI				
	Sama oli	22	25	0.126(0.0062-2.575)
	Urattha oli	2	0	5.425(0.2474-118.96)
	Thazhdha oli	1	0	3.122(0.121-80.395)
6.VIZHI	Niram			
	Iyalbu	22	25	0.126(0.006-2.575)
	Sivappu	3	0	7.933(0.388-162.07)
	Thanmai			
	Kaneer vadidhal	2	0	5.425(0.247-118.96)
	Kan Erichchal	3	2	1.568(0.238-10.300)
	Peelai Seruthal	2	2	1.000(0.129-7.717)
	Paarvai kuraivu	3	0	7.93(0.388-162.07)

	Iyalbu	15	21	0.285(0.075-1.086)
7.MALAM	Niram			
	Semmanjal	10	3	4.88(1.149-20.79)
	Manjal	5	0	13.68(0.714-262.18)
	Iyalbu	10	22	0.090(0.0214-0.386)
	Thanmai			
	Mala Sikkal	10	1	16.00(1.855-137.97)
	Iyalbu	5	23	0.021(0.003-0.124)
	kazhichal	10	1	16.000(1.855-137.97)
8.MOOTHIRAM	Neer Manam			
	Fruity	20	0	190.09(9.920-3642.47)
	Mild aromatic	3	24	0.0057(0.0005-0.0587)
	Ammonical	2	1	2.0870(0.176-24.616)
	Neer Niram			
	Colourless	18	0	125.80(0.176-24.61)
	Pale yellow	6	24	0.0312(0.0015-0.1189)
	Dark yellow	1	1	1.000(0.0591-16.928)
	Neer Nurai			
	clear	7	25	0.388(0.138-1.093)
	Cloudy	18	0	125.80(6.753-2343.42)
	Edai			
	High	22	0	327.85(16.048-

				666697.98)
	Normal	3	25	0.0031(0.0001-0.0623)
	Enjal			
	Present	5	0	13.68(0.714-262.18)
	Nil	20	25	0.0731(0.0038-1.400)

Note: *p-value <0.05, **p-value <0.01, ***p-value <0.001, ****p-value <0.0001, CI, confidence Interval

This examination of pulse character revealed the significant number of patients were having most of the patients were having pulsation (odds ratio 27.562, 95% CI 6.0756 to 125.0394), $p < 0.0001$), whereas significant number of healthy volunteers were having normal rhythm (paduthal) odds ratio 0.0275, 95% CI (0.0050-0.1521), $p < 0.0001$) compared to patients. Majority of the patient's pulse play was of pitha vatham than healthy volunteers (odds ratio 16.000, 95% CI, 4.0015-63.976), $p = 0.0001$). However in healthy volunteers, most of the persons were having vatha pitham (odds ratio 0.0219, 95% CI, 0.0038-0.1246, $p < 0.0001$). Examination of tongue revealed decreased salivation (odds ratio 125.80, 95% CI, 6.7532 to 2343.42, $p < 0.001$). Complexion and voice were of no diagnostic significance. In case of body examination, increase in pain on palpation (odds ratio 34.54, 95% CI, 1.888-631.962, $p = 0.01$) were observed in significant number of patients than healthy volunteers. Stool examination was not of diagnostic significance. Urine examination revealed patient's urine samples were having pale yellow colour (odds ratio 0.0312, 95% CI, 0.0015 to 0.1189, $p = 0.0001$), mild aromatic (odds ratio, 0.0057, 95% CI, 0.0005 to 0.0587, $p < 0.0001$), higher in density (odds ratio 327.85, 95% CI, 16.048 to 66697.98 $p = 0.0002$).

4. DISCUSSION

There are so many studies are conducted for treatment of specific disease entities in indigenous system of medicine^[12]. This study is to validate the traditional diagnostic procedures for specific disease entity. Wrist circummetric sign is a very simple tool used in Siddha practice. The prognosis of the disease is calculated by this method. Decreasing level of finger breath unit shows poor prognosis of the disease. Usually, the length of the twine

starts with four fingers and ends with 11 fingers. In this study, we observed significant number of patient's wrist circumference of 9 ½ finger units. Siddha literatures state that 9 ½ finger unit is the sign of carbuncle, one of the symptoms of Meganeer avathaigal. Several kinds of literature state the importance of wrist circumference with respect to the endocrine system and disease conditions. A study states that hyperinsulinemia is associated with increased bone mass^[13, 14]. Recent studies from independent laboratories show that the insulin regulatory system mediates communication between metabolic control and bone remodeling^[15, 16]. The circumference of the wrist could be a good parameter to analyze bone metabolism in relation to hyperinsulinemia because the IGF-1 (Insulin-like growth factor-1) levels are major determinant of bone geometry as demonstrated by their direct relationship with cross-sectional area of bone. Recent literature describes the wrist circummetric sign is an easy-to-detect bone anthropometric marker. Historically this has been included in the calculation of frame size, which is a parameter in evaluating the free fat mass to correct misclassification introduced by the use of body mass index^[17, 18]. Contrary to the body mass index, this wrist circummetric sign compares the two parts of the body (wrist and finger size), which are not influenced by variations of body fat, indicating the disease status attracts future research in this area. Possible explanations other than calcification status namely, hydration status, swollen fingers and emaciation are considered. In case of *shape of oil drop on urine*, similar diagnostic procedures are available in Ayurvedic system too namely taila bindu pariksha. Though shape of oil drop on urine seems to be a crude procedure, it is time tested and has been in practice for more than 2000 years. There are studies stating the importance of shape, spreading nature and direction of spreading of oil drop on urine and its diagnostic significance^[19]. Several types of research hypothesize that the spreading pattern of oil is mainly influenced by the surface active molecules and other metabolites present in the urine which are normally not recordable and they determine the spreading pattern of oil. The interfacial tension between the surface active molecules and the oil may provide possibilities of different shapes, speed and extent of spread^[20]. A study states that the cyclical variation of surface tension of urine recorded in female corresponds closely to the menstrual cycle. These findings support that the difference in hormone levels have an impact on the surface tension of the urine^[21]. Another study stating that the shape of the oil drop is affected in conditions of increased levels of FBS, PPBS, blood urea, urine specific gravity, albuminuria, glycosuria, DM neuropathy and DM retinopathy^[22]. Nowadays specific diseases or group of diseases taking common pathophysiological outcome are identified by specific markers present in the biological fluids which may decide the outcome of the shape and direction of the oil drop,

attracts further research in this direction. As per the Siddha concept, the spreading nature of a single drop of oil on the surface of the urine indicates the imbalance of specific humor and prognosis of the disease. In this study, the spreading pattern of oil on urine was in the form of sieve. Sieve pattern of spreading, according to the scripts indicates the incurable nature of the disease^[8]. Another study states that the sieve pattern of spreading indicates the disease of genetic origin^[19]. Eightfold examinations consist of examining eight areas of body and bodily functions, all of which reveal the places of balance and imbalance. Pitham is primarily responsible for initiating the disease process of Meganeer. In this study, significant numbers of patients were having hard waning pulsation and the pulse play of pitha Vatham. The pulse examination of healthy volunteers revealed to be in physiological state with respect to body nature, sex and age. Oral examination of the patients revealed tastelessness and decreased salivation. As per literature, dry tongue is a sign of vaadha humour derangement. Bodily examination revealed that the affected area was hot to touch and painful on palpation. Affected person's urine was pale yellow, fruity odor, higher in density, polyuria and with deposits. Theraiyar, one of the renowned authors of Siddha medicine described urine examination and stages of health. He had explained about the color and consistency of the urine in vitiated humor and disease. He also emphasized the spreading nature of single drop of oil on urine^[8]. In contrast to the conventional techniques, mean value based medical strategies are avoided in the constitution based traditional approach. Pathogenic disharmonies are classified in terms of dynamic traditional principles which cannot be directly equated with modern entities. Furthermore healthy states and disease are seen as a continuum in traditional Indian system. Diagnosis is believed to be the definition of snapshot within a constant flow of physiological and pathophysiological factors^[23]. Our traditional system of medicine was persistently criticized for its ambiguity. This perception, unfortunately, has led the world to be deprived of many plausible advantages of traditional health care supportive to a total quality life^[24, 25, 26, 27]. The primary understanding of traditional knowledge followed by a search into scientific linkage will be more appropriate for complementary medicine^[28]. So this system of diagnosis identifies the location of vitiation of humors and giving the ways for their correction.

5. CONCLUSION

It can be concluded that the Siddha diagnostic procedures (Wrist circummetric sign, shape of oil drop on urine and eightfold examinations) differentiate the patients of Meganeer

avathaigal from the healthy volunteers. These cost effective tools not only help in diagnosis but also indicates the prognosis of the disease and for reassuring the patient to be informed about the nature of disease. There exist general criteria that diagnosis is made using conventional methods and the traditional system of medicine is approached only for the treatment. Diagnosis in traditional system will prove to be a cost-effective, in-hand method for common people. If studies like this help in validating the diagnosis in traditional systems and the ambiguity arising due to any differences can be minimized.

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