

**STANDARDIZATION AND ACCURACY ASSESSMENT OF SIDDHA
ANTHROPOMETRIC TOOL – MANIKKADAI NOOL USING SKAD
[SOODAMANI KAYARU SOOTHIRAM ANALOGUE DESIGN]**

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ABSTRACT

Soodamani Kayaru Soothiram (SKS) is an Anthropometric work in Siddha medicine. One may reach diagnosis or predictions by measuring wrist circumference calculated with the subjects fingerbreadths in nos by using an in-elastic toin. The obtained finger inputs are interpreted with the textual descriptions. Many different methods of measurements are in practice but the accuracy varies with lots of bias generation. The Tool were studied under different variables for developing a standard protocol analog called SKad (Soodamani Kayaru Soothiram Analogue design). Three different Random observational /exploratory pilot studies were conducted on 234 subjects that focused on the Ideal Location of Finger measurement (ILM) to assess the point of maximum accuracy measurements, compared the SKS readings measured from both hands to study the change in variables and its accuracy and finally analyzed the scope and limitations of using Skad in large population samples. The Total Accuracy point (TAP) of middle finger measurement was the highest and distal was the lowest. Nearly 80 % Subjects shown identical readings in both hands in the second study. In the third study, the major input got was 10 Finger breadths. Nearly 50 % of the studies fall under Category II. The total accuracy of the SKS out of 150 subjects was 84.6% with diagnostic error showing 15%. With this preliminary approach, the tool was standardized in a better way to be used successfully in clinical practice with minimal errors.

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Keywords: Anthropometric Tools, Siddha Anthropometry, *Soodamani Kayaru Soothiram*, Skad.

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INTRODUCTION

Siddha medicine has its own anthropometric approach which classifies body temperament and composition on the basis of the individual's physical appearances.^[1] There was also the practice of using certain measurements and comparisons for assessing a person's character, personality from their physical appearance called *Samudrika Lekhsana Sasthiram* or Siddha Physiognomy.^[2] The features were assessed to predict the fate, fortunes and ailments that the individual has to suffer in his lifetime. The assessment also represented the standards of attributes concerned with ideal power, beauty and other personal qualities. There are also anthropometric calculations to measure the location of secret vital points called *Varmam*. There are 108 important points in the body in which the pranic energy (Vital Energy) is qualitatively and quantitatively high.^[3] The points within the

body are located by the physician by using Finger Breadth measurements (Fb) (*Viral Alavai* or *Angulam*) or Thread measurements (*Nool Alavai*).^[3]

Fb measurements are the most commonly used tool in *Varma* science. As per the science, the total height of a person is equal to 96 Finger breadths (Fbs).^[4] To study and locate each vital point with much accuracy, the Fb measurement is used by the *Varma* experts. One angulam or one Fb indicates the whole breadth of one finger (of Index finger), two Fb denotes the whole breadth of Index and middle finger, three Fb denotes the whole breadth of the index, middle and ring finger and Four Fb denotes the total breadth of Index, middle, ring and little fingers.^[3] The another aspect of thread measurements, described in the ancient Siddha work "*Varma Noolalavu Soothiram – 50*" involves locating the vital points by means of a long silk toin. As an

e.g.: with the toin, the circumference, hemi circumference of the vault is measured starting from the mid-eyebrow to locate the vital points within the head region).^[3]

Review on Agathiyar Soodamanikayaru Soothiram

The term “*Mani*” denotes Wrist and “*Kadai*” meaning measures. *Kayaru* meaning thread or toin and *Soothiram* means techniques of practice. It is a treatise of practice describing the methods of diagnosing diseases by using thread measurements of wrist circumference (WC) with the no of Fbs.^[5]

Soodamani Kayaru Soothiram (SKS) is an Anthropometric work in Siddha medicine.^[6] It is an age-old diagnostic & prognostic method. One may reach certain assumptions or predictions about the subjects ailments by measuring WC calculated with the subjects Fbs in nos by using an in-elastic toin. From the wrist line of the subject, four Fb is measured back to reach a point where the WC is assessed with the same toin. The length obtained is converted to the number of Fbs. The particular Fb thus obtained has specific descriptions in the texts, which may take into account for getting the full picture of the ailment.

There are 11 finger Input measurements with total 96 descriptions on various symptoms and signs. The inputs from 4 to 10 Fb has been mentioned and each Fb is again divided into 4 units, starting from a quarter ($1/4^{\text{th}}$ of 1Fb), half ($1/2$ of 1 Fb), 3 quarters ($3/4^{\text{th}}$ of 1Fb), and full Fb. Individual description of 11th Fb is only enlisted.

The above textual opinion roughly states about the method of measurement and its interpretation, but many expert opinions and different methods of measurements are available in clinical practice with variation in accuracy with many errors. Before commencing on any studies regarding SKS, the mode of descriptions said for each Fb inputs has to be ordered in such a way for the easy interpretation of the readings. On this regard based on the qualities of each *mukutram* (Three humors) and its nature of derangement influenced by diet, lifestyle, seasonal variations, body constitution, psychological and pathological factors, the entire readings (96 descriptions) from the texts were classified into *mukutram* deranged features (Humoral origin), Infectious origin and *Asathiya Kurigal* (Incurable signs) (Table: 1).

Table 1: Classification of SKS readings

Classification	Specified in Finger Inputs (Fb) as per SKS Texts
I. Humoral Origin (Mukutram)	
1 Vali (Vatham)	9
2 Azhal(Pitham)	9 ^{1/4} , 9 ^{1/2} , 9 ^{3/4} , 7, 6 ^{1/2} , 6 ^{1/4}
3 Iyyam (Kapham)	6 and 11
4 Vatha Pitham	7 ^{1/4} , 6 ^{3/4}
5 Pitham	8 ^{1/4} , 7 ^{3/4}
6 Pitham Vatham	10, 8 ^{1/2} , 8 ^{3/4} , 7 ^{1/2}
7 Kapham	6
8 Kapham Vatham	8
II. Miscellaneous: Infection Origins	9 ^{1/2} , 9 ^{3/4} , 8 ^{1/4} , 8 ^{1/2} , 7 ^{3/4} , 7 ^{1/2} , 7, 6 ^{1/4} , 6
III. Asathiya Kurikal (Incurable Signs)	6, 5 ^{3/4} , 5 ^{1/2} , 5 ^{1/4} , 5, 4 ^{3/4} , 4 ^{1/2} , 4 ^{1/4} , 4

In the textual references, there is no mention of which hand of the subject is selected for SKS reading. And as matter of fact, there are other statements in *Nadi* diagnosis (Pulse reading) works of literature which advices the physician to take the pulse reading from left hand in the case of females and right hand for males.^[1] The point of interest being the type of toin used for the study, the ideal selection of the hand and its impact on the accuracy of measurement, ideal location for measurement (ILM), how many repetitions per study to confirm the measurement, how to interpret the findings for predictions and prognosis, what will be the accuracy of the tool and to know the factors

which reduces it or makes it zero relevant (ZR), how to document and to standardize it for future references. All the above criteria's are very crucial for the scientific justification of this tool that enables the clinician to get clear-cut information about the pathological picture and its associations through SKS.

As there is no validated scientific works on this subject, the introduction of an Analog design (*Soodamanikayaru Soothiram* Analog Design (SKad) may help to perform SKS correctly as per the protocol.

AIMS & OBJECTIVES

Primary Objective

- ❖ To study the Manikkadai accuracy at different variables for developing a standard protocol analogue called SKad (*Soodamani Kayaru Soothiram Analogue design*).

Secondary Objective

- ❖ To the study the design on large sample size to evaluate its accuracy, diagnostic scope and limitations.

MATERIALS AND METHODS

II. 1. Study Design: Random Observational / Exploratory Research.

- **Sample Size:** 234
- **Number of studies:** 3
- **Study A:** To assess the accuracy of Ideal location of measurement (ILM) (Sample size: 40)
- **Study B:** To compare the SKS readings measured from both hands, to study the change in variables and its accuracy (Sample size: 28)
- **Study C:** To analyze the scope and limitations of using Skad in large population samples (Sample size: 150)
- **Place of Study:** Various medical camps across Kerala.
- **Study Period:** 1 year from August 2015- August 2016.

II. 2 Criteria of Selection of samples

Random allocated samples from all ages and both sexes.

Repetition of the study: 3 Repetitions per sample.

II. 3 Tool for study

1. Non elastic Toin: Standard length - 25 cm.(Fig 1)
2. Weigh meter and height scale.
3. Reference data.
4. Clinical research form.

II. 4 Methodology

- ❖ **Developments of SKad (Soodamani Kayaru Soothiram Analogue Design)**

The entire stepwise procedure from standardization to exploratory research is termed as SKad. This includes:

Step 1 Development of Standard Operating Procedures (SOP)

Procedure (Fig 2-6)

1. The subject is asked to sit comfortably with all the four fingers kept intact and parallel (Fig 2).
2. The physician will measure the total breadth of the total 4 fingers with the standard In- elastic toin (Fig 3).
3. **Ideal Location for measurement (ILM):** Middle portion of the four fingers or use the middle finger of left hand perpendicular with the root of the middle finger of the right

finger. The outer border of the breadth is taken as the mid position to measure the total breadth length of four fingers.

4. *Manikkadai Circumference Point*

(MCP): Use the length got to measure from the wrist line towards the back to reach a point. From the point, the circumference of the wrist area is measured with the same tool. The circumference length is again measured in total no of Fb in ILM (Fig 4, 5, 6).

- a. 1 Fb = Full breadth of the Index finger.
- b. 2 Fb = Full breadth of the index finger & middle.
- c. 3 Fb = Full breadth of the index finger, middle and ring.
- d. 4 Fb = Full breadth of the index finger, middle, ring and little finger.

Each Fb is divided into 4 quarters. Each value constituting 25% i.e., full Breadth = 100%, $\frac{1}{2}$ = 50%, $\frac{3}{4}$ = 75%, $\frac{1}{4}$ = 25% (Fig 7).

5. The SKS readings were repeated thrice and enrolled in the clinical

research form after further clinical interrogation with the subject.



Fig:1



Fig:2



Fig:3



Fig:4



Fig:5



Fig:6



Fig:7

Fig. 1-7: Step – 1 Procedure of Soodamani Kayaru Soothiram

Step 2: To assess the accuracy of ILM
(Sample size: 40) (Fig 8-10)

1. Each prediction sign is scored in accordance with the number of positive symptoms described

in the Siddha classical texts out of 100% (20% for 5 symptoms/25% for 4 symptoms)

2. Proximal, middle and distal finger breadth measurements of all the subjects were taken and followed the procedures as mentioned in Step 1.
3. The accuracy assessment of all the 3 locations was carried out through total accuracy point (TAP) by using the formula.



Fig 8: (Proximal measure)



Fig 9: (Middle measure)



Fig 10: (Distal measure)

Fig 8-10: Step - 2 Procedure of Soodamani Kayaru Soothiram to assess ILM

Total accuracy point (TAP) (X) = Total no: accuracy % (p+l+n+y)

Were $p = 25\%$, in which the subject presents $\frac{1}{4}$ of all the features of SKS reading. $i = 50\%$, in which the subject presents $\frac{1}{2}$ of all the features of SKS reading, $n = 75\%$, in which the subject presents $\frac{3}{4}$ th of all the features of SKS reading, $y = \text{positive } 100\%$, in which the subject presents all the features of SKS reading.

Step 3: To compare the accuracy of measurement in both hands (Sample size: 44)

SKS readings were measured in both hands of 27 males and 17 females as per step 1. Study of Value of equality (e) and difference (d) (e: d) is interpreted to find the difference or similarity in SKS values in both hand readings.

Step 4: To evaluate the scope, limitations and accuracy of Standard Operating

Procedures (Skad) of SKS on large samples.(Sample size: 150)

SKS readings were carried out on random cases belonging to both sexes as per step- 1

1. The clinical findings interpreted from the readings were categorized in the mode of how it helps the physician (scope) and how it does not (Limitations of the study) including zero relevance.
2. The Accuracy of relevance (percentage) is calculated by the sum of all relevant categories in 100 %.

RESULTS

Regarding the first study on comparing the SKS reading from different locations of proximal, distal and middle measures, the total accuracy point (TAP) of middle finger measurement was the highest (20) and distal measures were the lowest (7) (Table 2, 3).

The second study compared the readings of SKS from both hands in 27 males and 17 females belonging to age group 23 – 66 yrs, who randomly participated in the study. Based on this study nearly 41 subjects had shown identical SKS readings on both hands (Value of equality (e) = 93% There was a difference in SKS readings in only 3 subjects (Value of difference (d) = 7%. (Table 4 & Fig 11).

The third study on a large population where the standard analogue data from 150 subjects helped in categorizing the scope and limitations of SKS. The major input got was 10 Fb(51 subjects). Nearly 50 % of the studies fall under Category II. The total accuracy of the SKS out of 150 subjects were 84.6% with a total diagnostic error of 15%(Category IV) (Table 4, 5, 6, 7 and fig 12, 13).

DISCUSSION

Anthropometric index in Siddha medicine includes WC and Fb measurements. Fb is mainly used to locate Varma points, and when combined with WC it is used as prediction inputs as per *Soodamani Kayaru Soothiram* method. For scientific validation of such anthropometric tools, a large population has to be taken into account. The present study involved 234 subjects, randomly selected from medical camps. Initial step was to generate the SOP for the sample studies, textual references

and expert hand practices were considered to develop the common procedure as mentioned in step- 1.

The first study on ILM, threw light on the fact of using the middle location of fingers to measure the perpendicular length with the highest accuracy. Since the body frame varies with each individual, the possibility of putting a standard is difficult. An alternative and successful approach was by using the middle finger of left hand kept perpendicular with the root of the middle finger of the right finger. The outer border of the breadth is taken as the mid position to measure the length.

The second study reported that values obtained by measuring SKS in both hands were equal. The study did not show major relevance for selecting the hand according to the sex. Neither proving nor disproving the concept, has the custom of selecting hand as per Nadi Thathuvam been to be followed without a doubt.

Table 2: Assessment of SKS readings in both hands

Subject	Position of Toin For measurement	Finger Breadth (in cms)	Wrist Circumference (in cms)	Manikkadai Measurement (in no: Finger breadth)	Accuracy (in %)	*
1.	Proximal	8.1	19	10	0 %	
	Middle	7.8	19.5	9 ^{1/2}	100 %	
	Distal	7.5	19.3	9 ^{1/2}	100 %	

2.	Proximal	6.3	18	$11^{1/2}$	0 %
	Middle	6	17.5	$11^{1/4}$	0 %
	Distal	5	17	$11^{1/4}$	0 %
3.	Proximal	7.5	17.5	$9^{1/2}$	0 %
	Middle	7	17.3	10	100 %
	Distal	6.6	17	$9^{1/2}$	0 %
4.	Proximal	9	2.5	$9^{1/2}$	0 %
	Middle	8	19	$9^{1/2}$	0 %
	Distal	7.5	18.8	10	100 %
5.	Proximal	9	21	10	100 %
	Middle	8.2	20.5	10	100 %
	Distal	7.2	20.5	$10^{3/4}$	0 %
6.	Proximal	7.5	17.5	$9^{1/2}$	100 %
	Middle	7	17	$9^{1/2}$	100 %
	Distal	6.5	16.8	10	0 %
7.	Proximal	8.3	20	$9^{1/2}$	100 %
	Middle	7.6	19.5	$9^{1/2}$	100 %
	Distal	7	19.5	11	0 %
8.	Proximal	7.3	16.5	10	25%
	Middle	6.8	17	10	25%
	Distal	6.5	16.8	$10^{1/2}$	0 %
9.	Proximal	8	17.4	10	100 %
	Middle	7	17.4	10	100 %
	Distal	6	17	$10^{1/2}$	0 %
10.	Proximal	8.5	24	12	0 %
	Middle	8.2	24	12	0 %
	Distal	8.2	23	12	0 %
11.	Proximal	8	20.5	$10^{1/2}$	0 %
	Middle	8	20	10	50 %
	Distal	6.7	19.3	$10^{1/2}$	0 %
12.	Proximal	7.5	21.5	$11^{1/2}$	0 %
	Middle	7.3	21	$11^{1/2}$	0 %
	Distal	7	22	12	0 %
13.	Proximal	9	20.5	10	100 %
	Middle	8.5	20.5	10	100 %
	Distal	8	20	10	100 %
14.	Proximal	8	23	$11^{1/2}$	0 %

	Middle	8	22	$10^{1/2}$	0 %
	Distal	7.5	21.5	$11^{1/2}$	0 %
15.	Proximal	8	23.5	$11^{1/2}$	0 %
	Middle	8	22	11	0 %
	Distal	8	23	11	0 %
16.	Proximal	7.7	17	$10^{1/4}$	0 %
	Middle	7.4	17	$9^{3/4}$	0 %
	Distal	7	16.5	$10^{1/4}$	0 %
17.	Proximal	7.9	19	$10^{1/2}$	0 %
	Middle	7.6	19	10	75 %
	Distal	7.5	19	10	75 %
18.	Proximal	8.3	20.8	10	100 %
	Middle	8	22.5	10	100 %
	Distal	8.5	10.3	$10^{1/2}$	0 %
19.	Proximal	7.6	20.5	10	50 %
	Middle	8.3	19.5	10	50 %
	Distal	8	20.4	$10^{1/2}$	0 %
20.	Proximal	7.6	19	10	100 %
	Middle	7.3	18	10	100 %
	Distal	6.5	17.9	$10^{1/2}$	0 %
21.	Proximal	8.6	21	10	100 %
	Middle	8.5	20.5	10	100 %
	Distal	7.8	20.5	$10^{1/2}$	0 %
22.	Proximal	8.4	20	$9^{3/4}$	0 %
	Middle	8	20.5	$9^{1/2}$	100 %
	Distal	7.8	19.6	10	100 %
23.	Proximal	8.2	23.5	12	0 %
	Middle	8	23	12	0 %
	Distal	7.6	22.3	12	0 %
24.	Proximal	9	21	10	100 %
	Middle	8.2	20.5	10	100 %
	Distal	7.6	20	11	0 %
25.	Proximal	8	19	$9^{1/4}$	100 %
	Middle	7.8	19	$9^{1/4}$	100 %
	Distal	7.8	19	$9^{1/4}$	100 %
26.	Proximal	6.7	17.5	$10^{1/4}$	0 %
	Middle	6.5	17	10	100 %

	Distal	6.4	17.5	10 ^{1/4}	0 %
27	Proximal	8.1	18	9	50 %
	Middle	8	17.7	9	50 %
28	Distal	7.5	18	9 ^{1/4}	0 %
	Proximal	8	18.5	10	0 %
	Middle	7.5	18	9 ¼	50 %
	Distal	7.5	18	9 ¼	50 %

*Accuracy. Presence (+) of all score = 100 %, Absence (-) of score/ Undescribed = 0%.

Presence (+) of ¼ correct score = 25 %, Presence (+) of ½ correct score = 50 %, Presence (+) ¾ correct score = 75%.

Table 3: Total accuracy point (ILM) (N= 28)

<i>Manikkadai Toin</i>	(o)0%	(p)25%	(l)50%	(n)75%	(y)100%	(x)TAP*
Location	Accuracy	Accuracy	Accuracy	Accuracy	Accuracy	
	(no: subjects)					
Proximal Measures	15	1	2	-	10	13
Middle Measures	8	1	4	1	14	20
Distal Measures	21	-	1	1	5	7

*Total Accuracy Point (TAP) (X) = Total no: accuracy % (p+l+n+y)

Table 4: SKS Reading assessments in both hands (N=44)

Case No	Age/Sex	Sex	Manikkadai Measurement in (Finger Breadths)	
			Right hand	Left Hand
1	23	F	9	9
2	24	M	12	12
3	24	M	10	10
4	24	M	12	12
5	27	M	11 ^{1/2}	11 ^{1/2}
6	28	F	10 ^{1/2}	10 ^{1/2}
7	30	M	10 ^{1/4}	10 ^{1/4}
8	31	F	10	10
9	32	M	9 ^{1/2}	9 ^{1/2}
10	32	M	10 ^{1/2}	10 ^{1/2}
11	34	M	9 ^{1/4}	9 ^{1/4}
12	35	M	9 ^{3/4}	9 ^{3/4}

13	35	F	10	10
14	36	M	11	11
15	39	F	10	10
16	40	M	11	11
17	40	F	10	$10^{1/2}$
18	40	F	$8^{1/2}$	$8^{1/2}$
19	42	M	10	10
20	43	F	$10^{1/2}$	$10^{1/2}$
21	44	F	11	11
22	45	M	$10^{1/2}$	10
23	46	M	$10^{1/2}$	$10^{1/2}$
24	46	M	10	10
25	48	M	$8^{1/4}$	$8^{1/4}$
26	49	F	10	10
27	49	F	$9^{3/4}$	$9^{3/4}$
28	49	F	10	10
29	50	M	$10^{1/2}$	$10^{1/2}$
30	50	F	$11^{1/2}$	$10^{1/2}$
31	50	M	$9^{1/2}$	$9^{1/2}$
32	51	M	10	10
33	52	M	$9^{1/4}$	$9^{1/2}$
34	52	F	11	11
35	53	M	$9^{3/4}$	$9^{3/4}$
36	55	F	$9^{3/4}$	$9^{3/4}$
37	56	M	10	10
38	59	M	$9^{1/4}$	$9^{1/4}$
39	60	F	10	10
40	60	M	10	10
41	62	M	10	10
42	62	F	10	10
43	62	M	$9^{1/4}$	$9^{1/4}$
44	66	F	$10^{1/2}$	$10^{1/2}$

Table 5: Category wise divisions of SKS assessments large population studies (N=150)

Category	Scope and Limitations
I	Assessment of Symptoms/Clinical conditions with different dimensions of causes from direct subject expression (Direct diagnosis). Manikkadai reading directly assessed all the chief complaints presented by the subject.
II	Assessment of symptoms/ Clinical conditions with different dimensions of causes from leading true positive interrogations (Indirect subject expression). Manikkadai assessment uncovered the symptoms that may not expressed completely by the subject while presenting the complaints or either it had missed in the initial stage of interrogations. The clinician leaded questions after SKS procedures and concluded with the positive findings obtained from the subject.
III	Assessment of sequence of clinical events from its origin to progression up to the present stage and further predictions or prognosis(Sequential expression and predictive signs). Manikkadai assessment helped to sort out the starting phase of the complaint and its sequence of events progressing to the present condition and its future implications.
IV	The assessment with zero relevance that did not helped the physician in terms of diagnosis or its management. This included: <ol style="list-style-type: none"> 1 Manikkadai reading with false values: The biased readings, that may be occurred due to misinterpreted or false assumptions (Diagnostic errors), and when the subject willing fully negated the findings (Subject errors). 2 Manikkadai readings that is beyond the 11 Fb inputs: The readings were well observed in obese individuals who showed higher Body Mass Index (BMI).

Table 6: Category wise divisions of SKS assessments obtained after large population studies.

Category	No: Cases (p)	Total study % (y) out of n $y = (p) * 100 / n$
I	40	26.6
II	75	50
III	12	8
IV	23	15.3

n = 150

Total Accuracy assessment of the study (%) (C₁+ C₂+ C₃) = 84.6%

Table 7: Distribution of cases (N= 150)

Finger Breadth	No: Subjects in each Fb inputs	Total study % out of n
10	51	34
10 ^{1/2}	12	8
11	5	7.3
11 ^{1/2}	4	2.6
12	2	8
9	17	6
9 ^{1/4}	10	6.6
9 ^{1/2}	16	10.6
9 ^{3/4}	10	6.6
8 ^{3/4}	4	2.6
8 ^{1/2}	2	1.3
8	1	0.6
8 ^{1/4}	5	3.3
7 ^{1/2}	1	0.6

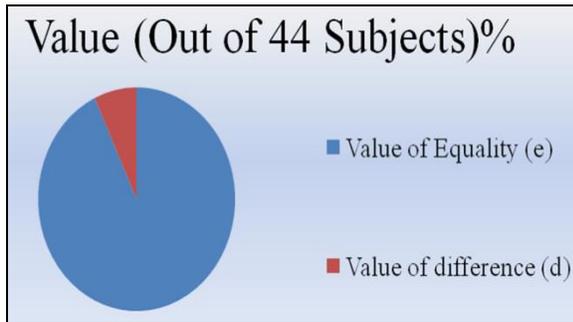


Fig 11: SKS readings to compare variables from both hand measurements.

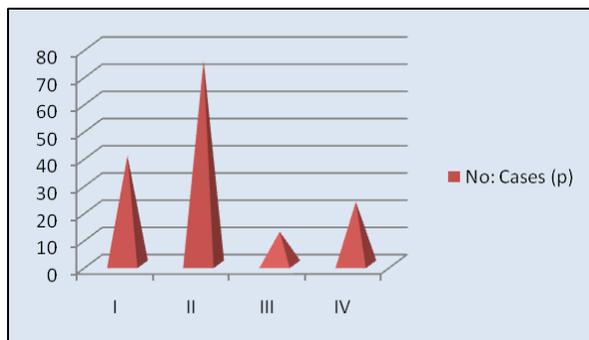


Fig 12: Category wise distribution of cases

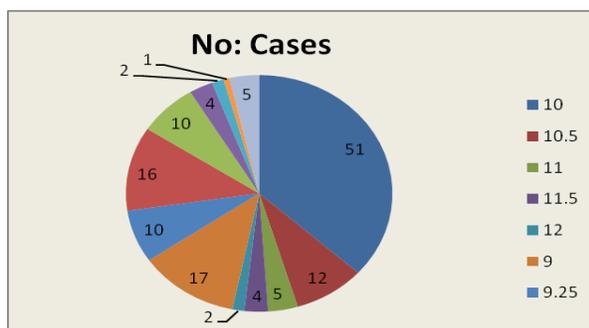


Fig 13: Distribution of SKS reading in 3rd study

The final study on large samples by using the prepared standard design (Skad) helped to categorize the different scope and dimensions of using the tool. Out of total of 150 samples, 40 cases fall under category –I,

who presented all the symptoms directly and as mentioned in the corresponding Finger inputs without leading questions. Category- II (75 cases), were shown positive findings after putting forward leading questions of the corresponding finger inputs. Category – III (12 cases), in which all the subjects showed positive findings from multiple finger inputs, unlike the first two categories which shown single positive finger input. This category helps the clinician to track the initial stage and origin of the disease, the nature of its progression and its future implications (Predictive signs). Category – IV (13 cases), includes the findings and readings that are irrelevant (Zero relevance) to the condition of the subject and doesn't fall under any of the above categories. This category marks the errors of reading either due to technical, diagnostic, subjective or unknown reasons. In large population studies, strictly following the SOP will reduce the incidence of Category – IV.

Summary of the Study

Standardizing this traditional diagnostic tool is very crucial to improve the accuracy of predictions and findings. Accurate assessments of the finger input descriptions relevant to the subjects medical conditions help the clinician to understand the humoral

involvement, nature of the disease, symptomatology, clinical associations, to track the initial stage of pathogenesis, its progressions and future implications, stage of curability etc. An ideal standard for measurement called “SKad (*Soodamani Kayaru Soothiram Analogue design*) was developed with consultation from expert hand practices and textual references.

Limitations of the Study

The study was unable to concentrate its findings in the pediatric population and healthy subjects. Value of zero relevance (ZR) confuses the diagnostic views. Even though with consequent repetitions of the SOP, there still persisted zero relevance with unknown reasons. The phenomenal changes of body frame and constitution of every individual is variant with time, from one era to another. This is a well-established theory of human body change over. The period in which the text was written, and its measurements may be accurate and practical considering the body makeup of the individuals who lived in that period. The inputs above 11 Fbs were either missing from the texts or undescribed. Persons with higher body mass index (BMI) tend to show higher finger input readings above 10 and since there are no valid descriptions, the reading may become zero relevant. This needs proper

attention in upcoming studies for validating the tool.

CONCLUSION

The traditional view of disease prediction can be also put forward on the concept of body constitution and the influence of *Mukutram* (Three humors) in the body. The variations of mukutram due to diet, lifestyle, climate, pathological effects may alter the body composition, muscle mass, bone density, body fat content with the overall change in anthropometric indexes is the most possible mechanism to be studied under SKS diagnostic science. The normal qualities of each mukutram and the deranged features is better understood to have a clear-cut idea on the conceptology behind SKS. The prime goal of the researcher undertaking anthropometric studies is to reduce the possible error readings and improper interpretation of the variables. *Soodamani Kayaru Soothiram Analog Design* (Skad) developed through this method may be advocated in all the manikkadai pertaining single case studies or case series or in large samples.

With this preliminary approach, our studies bring forth the value of traditional diagnostic science like SKS to be used as a supporting tool in clinical practice. The scope and limitations were understood for a better

understanding of the tool. The measures to rectify the errors will improve its accuracy and further makes a way to its clinical acceptance.

ACKNOWLEDGEMENT

We like to acknowledge Siddha Kaivalyam Healthcare and Research, Kannur, Kerala for providing all the services and support for the successful completion of the study.

Conflict of Interest Statement-

There is no conflict of interest.

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