PROCESS OF TOOL DEVELOPMENT AND VALIDATION OF JIHWA PAREEKSHA

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ABSTRACT

In Ayurveda, the process of *Roga Vinishchaya* (identifying the nature of a disease) is considered of great importance. The diagnosis of diseases employs various methods, with *Jihwa Pareeksha* (tongue examination) being one that holds considerable significance. In addition to other assessments like *Astasthana Pareekshana* and *Lakshana* (symptom analysis), observing the tongue is a simple but essential method aiding in the *Saapeksha nidana* (diagnosis of diseases). The *Jihwa* mirrors the condition of internal organs. Traditional *Jihwa Pareeksha* (tongue examination) methods describe various characteristics that can reveal the health of specific internal organs just by examining the tongue's surface. A practitioner who fails to diagnose based on the signs observed in the *Nadi* (pulse), *Mootra* (urine), or *Jihwa* (tongue) is prone to making mistakes that could harm the patient, suggesting lack of skill. Research on the concept of *Jihwa Pareeksha* is limited, and the studies conducted so far have lacked a validated tool for assessing the *Jihwa*. Therefore, attempt is made to develop a *Jihwa Pareeksha* tool to evaluate *Dosha Pradhanyata*.

INTRODUCTION

In *Ayurveda*, *Roga Vinishchaya* (determining the nature of a disease) is highly valued. This process involves two main approaches.[1] *Roga Pareeksha and Rogi Pareeksha. Acharya Charaka* emphasized the significance of *Rogi Pareeksha* by stating that a patient must be thoroughly examined before initiating any treatment, and the physician's role begins only after this examination.[2] The diagnosis of diseases involves several methods, one of which is *Jihwa Pareeksha* (the examination of the tongue), which holds significant importance. This is elaborated by *Acharya Yogaratnakara* as one of the eightfold examinations, providing insights into the condition of the tongue in various health states.[3] Along with other examinations of *Astasthana Pareekshana* and *Lakshana* (symptom analysis), observing the tongue examination is a straight forward yet crucial method to know *Saama*, *Niraama* the balanced, imbalanced, *Kshaya* (decreasing), or *Vruddi* (increasing) *Avastha* of the *Doshas*, aiding in the *Saapekshanidana* (diagnosis of diseases).

OBJECTIVE

1. Developing a tool for examination method of *Jihwa Pareeksha* and to be validated.

REVIEW ON *JIHWA PAREEKSHA*

The *Jihwa* reflects the state of internal organs. Traditional methods of *Jihwa Pareeksha* (tongue examination) outline various features that can indicate the health of specific internal organs simply by looking at the tongue's surface. The examination of the *Jihwa (*tongue) is part of *Asthasthana Pareeksha* (eightfold diagnostic process). Each patient's tongue should be assessed, focusing on its characteristics such as its *Swaroopa* (appearance) and *Varna* (colour). Understanding the *Prakruta Jihwa* (normal condition of the tongue) helps in identifying any *Vikruta Lakshana* (abnormalities). A practitioner who cannot diagnose through the signs observed in the *Nadi* (pulse), *Mootra* (urine), or *Jihwa* (tongue) is likely to make errors that could endanger the patient, indicating a lack of skill.

LAKSHANA BASED ON *DOSHA* PREDOMINANCE
VATA[4]

- *Sheeta* - Cold
- *Khara   Sparsha*-Roughness
- *Sphutita* - Fissures

PITTA[5]

- *Rakta* - Red colour
- *Shyama* - Black colour

KAPHA[6]

- *Shubra* - White colour
- *Ati Picchila* - Sticky

DWANDWAJA[7]

- Mixed features

SANNIPATAJA[8]

- *Krishna* - Black colour
- *Sakantaka* - Thorny appearance
- *Shushka* - Dry

PROCESS OF TOOL DEVELOPMENT OF *JIHWA PAREEKSHA*

As the research works on the concept of *Jihwa Pareeksha* is minimal and the works that were carried out had no validated tool to assess the *Jihwa*. Hence it becomes necessary to develop a Jihwa *Pareekshsa* tool to estimate the *Dosha Pradhanyata*. The guidelines for the development of tool are summarised. There are four phases to creating a tool

1. Tool development
2. Scale development
3. Tool evaluation
4. Content validity.

These can be break down into following steps.

1. Identification of all the literature available regarding *Jihwa Pareesha*
2. Identification of domains and item generation
3. Preliminary Pilot study
4. Item reduction
5. Extraction of latent factors
6. Test for dimensionality
7. Test for validity
8. Test for reliability.

STEP 1: IDENTIFICATION OF ALL THE LITERATURE AVAILABLE REGARDING
JIHWA PAREESHA

The information regarding the *Jihwa Pareeksha* was collected from the *Yogarathnakara.* Other common pathological symptoms of *Jihwa* are also considered based on the literature available in some of the disease conditions. **Table No: 1**

STEP 2: IDENTIFICATION OF DOMAINS AND ITEM GENERATION

The 14 domains were identified with the assessment tool.

Divided into *Darshana* (inspection) and *Sparshana* (palpation) *Pareeksha* methods.

Nominal and ordinal pattern of data is included.

Positive and negative response were noted.

Scoring is given according to dosha predominance. **Table No: 2**

DOMAIN 1: *SPUTITHA*: The word meaning of *Sputhitha* is broken, split, cracked. In this context is considered as fissure on the tongue. If positive finding is seen then score is for *Vata Dosha.*

DOMAIN 2: *PARIDAGDHA*: The word meaning of *Paridagdha* is burnt. In this context it is considered as ulcers over the tongue. If positive finding is seen then score is for *Pitta Dosha.*

DOMAIN 3: *VARNA*: The word meaning of *Varna* is colour. In this context different pathological colours explained according to *Dosha Pradhanyata* are considered.

रक्त - कुङ्कुमम् । ताम्रम् - red colour - *Pitta Dosha*

श्याम - कृष्णगुणविशिष्टः । - black colour - *Pitta Dosha*

पित्त - पीत वर्ण । - yellow colour - *Pitta Dosha*

शुब्र - शुक्लवर्णः । - white colour - *Kapha Dosha*

कृष्ण - निलान्जनम् - bluish black colour – *Sannipataja*

DOMAIN 4: *ATI PICCHILA*: The word meaning of *Picchila* is *Lepana*. In this context it is considered as coating over the tongue. As it is explained as *AtiPicchila*, excessive coating over the tongue should be considered. By taking a reference of standard chart for tongue

coating framed by the previous works, colours considered for assessment are, White coating, White – yellow coating, yellow coating, Brown coating, Grey coating, Black coating.

A	0-2	B	0-2	C	0-2
D	0-2	E	0-2	F	0-2

Assessment of Extent of tongue coating is considered as per The Winkel Tongue Coating Index**,** and a score is decided according to the same.

Winkel Tongue Coating Index: The dorsum of the tongue is divided into sections and the amount of tongue coating is graded subjectively (0-2) for each section. The total score, ranging from 0-12, is calculated by adding the scores for each individual section. Score per section: 0 – no coating, 1 – light coating, 2 – heavy coating

If positive finding is seen then score is given for *Kapha Dosha.*

DOMAIN 5: *KANTAKA:* The word meaning of *Kantaka* is a thorn or anything pointed. The Papillae on the tongue causes a thorny appearance and the hyperpigmentation of the tongue is due to pigmentation of the papillae. In this context*, Kantaka* is considered as pigmentation over the tongue. If the *Kantaka* (hyperpigmentation of the papillae) is present then the score is given for *Pitta Dosha*.

DOMAIN 6: SHAPE OF THE TONGUE: Based on TCM (traditional Chinese medicine), there are 5 tongue shapes. Rectangle, Acute triangle, Obtuse triangle, Square, Circle. As there is no any reference regarding the tongue shape in the texts, shapes other than above explained tongue shapes are considered as abnormal.

DOMAIN 7: *SHEETA:* The word meaning of *Sheeta* is cold, chilled. In this context it is considered as decreased temperature over the tongue. By placing the clinical thermometer over the tongue temperature is assessed.

Normal oral temperature – 36 to 38-degree Cel.

<36-degree Cel - presence of *Sheeta* over tongue.

>38-degree Cel - absence of *Sheeta* over tongue.

If positive finding is seen then score is given for *Vata Dosha.*

DOMAIN 8: *PRASUPTHA:* The word meaning of *Prasupta* is *Nidritha*. In this context it is considered as paralysis of the tongue i.e. decreased sensory and motor activity.

Sensory activity: assessment by temperature sensation – temperature sense is examined by glass test tube containing cold water and hot water taken separately. Its bottom and sides were made to touch to different areas of the tongue, commenting from tip of the tongue, lateral sides of the tongue and dorsal surface of the tongue.

Motor activity: mobility of the tongue is assessed by clinical grading scale for assessment of anterior and posterior tongue mobility using the tongue range of motion ratio (TRMR) and lingual palatal suction (LPS) respectively. **Table No: 3**

If positive finding is seen then score is given for *Vata Dosha.*

DOMAIN 9: *SUSHKA:* The word meaning of *Sushka* is *Nisneha*. In this context it is considered as moisture over the tongue. It can be assessed by four methods. They are,
1. Oral moisture level by oral moisture checking device.
2. Stimulated whole saliva volume (S-WSV).
3. Unstimulated whole saliva volume by spitting method (U-WSV).
4. Unstimulated whole saliva volume by gauze dip method.
   In this study unstimulated whole saliva volume by gauze dip method.

Gauze dip method: patient is made you sit in comfortable position and widely open his/ her mouth as much as possible. A 10 layered gauze piece is kept over the tongue for 1 minute. After 1 minute gauze is checked for amount of soakage.

Moist   -   9-10 layer

Mild dryness   - 6-8 layer

Moderate dryness - 3-5 layer

Severe dryness   -   0-2 layer

If positive finding is seen then score is given for *Vata Dosha.*

DOMAIN 10: *RUKSHA:* The word meaning of *Ruksha* is *Parushya, Shoshane Ruksha.* It is considered as texture of surface of the tongue. Texture of surface of the tongue: Smooth and Rough. It is assessed by palpation method.

Palpation method: with gloved hands, hold the tongue with gauze in one hand, use the thumb and index finger of the other hand to gently feel the tongue for texture. If positive finding is seen then score is given for *Vata Dosha.*

DOMAIN 11: *KHARA SPARSHA:* The word meaning of *Khar Sparsha* is *Lekhana.* It is considered as texture of the tongue. If positive finding is seen then score is given for *Vata Dosha.*

DOMAIN 12: *GURU:* The word meaning of *Guru* is heavy. It is considered as heaviness of the tongue. It is assessed by range of movements of the tongue as range of movements hampered in the heaviness of the tongue. If positive finding is then score is given for *Kapha Dosha.*

DOMAIN 13: *BAHULA:* The word meaning of *Bahula* is wide or broad. In this context it is considered as increased size of the tongue. It is assessed by measuring the tongue by the help of tongue depressor. The length is measured under 3 gradings.

Method of tongue measurement: it is measured from the base of the epiglottis to the tip of the tongue behind the lower incisors. Average tongue is approximately 8.5 cm in males, 7.9 cm in females. So, the below gradings are considered for the measurement.

Large   -   >9cm

Medium   -   8-9 cm

Small   -   <8cm

If positive finding is seen then score is given for *Kapha Dosha.*

DOMAIN 14: Ph: pH of the tongue can be assessed by placing a pH paper over tongue. There is no any reference regarding checking the pH of the tongue and cannot be corelated. So, this domain is excluded.

STEP 3: PRELIMINARY PILOT STUDY

A preliminary pilot study is conducted on 30 healthy individuals to test the feasibility, time, cost and for refinement. **Outcome**.

- Identified the issues with data collection tools, protocols and the procedure that needs adjustment.
- gathered preliminary data and feedback.

- Revised the protocols of the administration of the tool.

- Identified potential challenges or barriers before full scale implementation.

STEP 4: ITEM REDUCTION

The tool is reduced to 12 domains to improve the efficiency and effectiveness.

Eliminated items that are confusing or poorly worded.

शाल्मली कण्टक, रुक्ष, *Shakchandana Prakasha* – these words are unclear and difficult to understand.

Removed redundant items that do not contribute unique information to increase the reliability. SHAPE, pH – these do not contribute in prediction of *Dosha Pradhanyata*.

STEP 5: EXTRACTION OF LATENT FACTORS

The successful extraction of latent factors can provide valuable insights into the data, guiding further analysis and enhancing theoretical understanding.

- Identified underlying relationships within a set of observed variables.

- Simplified the datasets by reducing the number of variables into a smaller number.

STEP 6: TEST FOR DIMENSIONALITY

The goal of testing for dimensionality is to confirm the number of constructs underlying the data, leading to a more precise understanding of the relationships among variables and aiding in the development of valid measurement instruments.

- Visualized the similarity or dissimilarity of data points in a reduced-dimensional space.
  Eg: *Sushka* and *Ruksha* almost similar

- Analysed data to see if items fit a unidimensional model or if they suggest multiple dimensions.

STEP 7: TEST FOR VALIDITY

Testing for validity is essential to ensure that measurement tools are reliable and accurately reflect the constructs of interest, thus enhancing the credibility and applicability of research findings.

Methods: Content Validity – done by Expert Review – In department review is done by the professors of our own department and evaluated the comprehensiveness of items. Further

experts are selected after considering the qualification and background of the reviewers to ensure the review is unbiased and considers multiple perspectives. All 7 reviewers are qualified with MD *Ayurveda* in *Roganidana* and *Vikriti Vigyana* subject and are having teaching experience in various institutes of Karnataka and Kerala states.

Validation criteria for expert reviews included the following elements

1. **Relevance** – ensuring the content aligns with current practices in the specific domain.

2. **Accuracy**: Verify that the information is factually correct and supported by reliable sources or data.

3. **Clarity**: Assess whether the material is presented in a clear, understandable manner, avoiding jargon unless necessary.

4. **Consistency**: Look for consistency in terminology, formatting, and overall presentation throughout the review.

5. **Feedback Mechanism**: Include a way for reviewers to provide constructive feedback, highlighting areas for improvement.

The questionaries for expert review are provided in google forms and the responses are collected in the form of 5 options i.e. strongly disagree, disagree, neutral, agree and strongly agree. The results of an expert review are collected and tested for validation of tool. **Table No: 4**

**. Validation coefficient / Correlation is significant at the 0.01 level (2-tailed). *Sputhita, Sushka, Guru*

*. Validation coefficient / Correlation is significant at the 0.05 level (2-tailed).

Varna, Kantaka, Kharasparsha, Bahula

Table No: 1

Sl. No	*Vataja*	*Pittaja*	*Kaphaja*	*Sannipataja*	*Dvandwaja*
1	शीत	रक्त	शुभ्र	कृष्ण	Mixed features
2	खर स्पर्श	श्याम	अति पिच्छिल	कृष्ण कण्टक	
3	स्फुटित	पित्त	गुरु	शुष्क	
4	प्रसुप्त	परिदग्ध	बहुल		
5	रूक्ष	रक्त कण्टक	शाल्मली कण्टक		

Table No: 2

दर्शन परीक्षा	स्पर्शन परीक्षा
स्फुटित	शीत
परिस्निग्ध	प्रसुप्त
वर्ण – रक्त, शुभ्र, श्याम, पित्त	शुष्क
पिच्छिल	रुक्ष
कण्टक	खर स्पर्श
SHAPE	गुरु
	बहुल
	pH

Table No: 3

Grade	Description	Anterior tongue mobility TRMR- TIP	Posterior tongue mobility TRMR- LPS
1	Highly above	>80%	>60%
2	Normal range	50-80%	30-60%
3	Moderately restricted	<50%	<30%
4	Severely restricted	<25%	<5% / unable to do

Table No: 4

Correlations		Trividha pareeksha	SPUTITHA	PARIDAGDHA	SHAPE	VARNA	PICCHILA	KANTAKA	SHEETA	PRASUPTHA	SHUSHKA	KHARA SPARSHA	GURU	BAHULA	Total
Trividha pareeksha	Pearson Correlation	1	1.000**	-.258	.240	.764*	.645	.764*	.258	.730	1.000**	.764*	1.000**	.764*	.889**
	Sig. (2-tailed)		0.000	.576	.604	.046	.117	.046	.576	.062	0.000	.046	0.000	.046	.007
	N	7	7	7	7	7	7	7	7	7	7	7	7	7	7
SPUTITHA	Pearson Correlation	1.000**	1	-.258	.240	.764*	.645	.764*	.258	.730	1.000**	.764*	1.000**	.764*	.889**
	Sig. (2-tailed)	0.000		.576	.604	.046	.117	.046	.576	.062	0.000	.046	0.000	.046	.007
	N	7	7	7	7	7	7	7	7	7	7	7	7	7	7
PARIDAGDHA	Pearson Correlation	-.258	-.258	1	.372	0.000	.300	0.000	-.300	-.354	-.258	0.000	-.258	0.000	.030
	Sig. (2-tailed)	.576	.576		.411	1.000	.513	1.000	.513	.437	.576	1.000	.576	1.000	.948
	N	7	7	7	7	7	7	7	7	7	7	7	7	7	7
SHAPE	Pearson Correlation	.240	.240	.372	1	.367	.372	.734	.496	-.132	.240	.367	.240	.734	.609
	Sig. (2-tailed)	.604	.604	.411		.418	.411	.060	.257	.779	.604	.418	.604	.060	.147
	N	7	7	7	7	7	7	7	7	7	7	7	7	7	7
VARNA	Pearson Correlation	.764*	.764*	0.000	.367	1	.592	.500	0.000	.418	.764*	1.000**	.764*	.500	.778*
	Sig. (2-tailed)	.046	.046	1.000	.418		.162	.253	1.000	.350	.046	0.000	.046	.253	.039
	N	7	7	7	7	7	7	7	7	7	7	7	7	7	7
PICCHILA	Pearson Correlation	.645	.645	.300	.372	.592	1	.592	.400	.636	.645	.592	.645	.592	.810*
	Sig. (2-tailed)	.117	.117	.513	.411	.162		.162	.374	.124	.117	.162	.117	.162	.027
	N	7	7	7	7	7	7	7	7	7	7	7	7	7	7
KANTAKA	Pearson Correlation	.764*	.764*	0.000	.734	.500	.592	1	.592	.418	.764*	.500	.764*	1.000**	.898**
	Sig. (2-tailed)	.046	.046	1.000	.060	.253	.162		.162	.350	.046	.253	.046	0.000	.006
	N	7	7	7	7	7	7	7	7	7	7	7	7	7	7
SHEETA	Pearson Correlation	.258	.258	-.300	.496	0.000	.400	.592	1	.354	.258	0.000	.258	.592	.466
	Sig. (2-tailed)	.576	.576	.513	.257	1.000	.374	.162		.437	.576	1.000	.576	.162	.292
	N	7	7	7	7	7	7	7	7	7	7	7	7	7	7
PRASUPTHA	Pearson Correlation	.730	.730	-.354	-.132	.418	.636	.418	.354	1	.730	.418	.730	.418	.616
	Sig. (2-tailed)	.062	.062	.437	.779	.350	.124	.350	.437		.062	.350	.062	.350	.141
	N	7	7	7	7	7	7	7	7	7	7	7	7	7	7
SHUSHKA	Pearson Correlation	1.000**	1.000**	-.258	.240	.764*	.645	.764*	.258	.730	1	.764*	1.000**	.764*	.889**
	Sig. (2-tailed)	0.000	0.000	.576	.604	.046	.117	.046	.576	.062		.046	0.000	.046	.007
	N	7	7	7	7	7	7	7	7	7	7	7	7	7	7
KHARA SPARSHA	Pearson Correlation	.764*	.764*	0.000	.367	1.000**	.592	.500	0.000	.418	.764*	1	.764*	.500	.778*
	Sig. (2-tailed)	.046	.046	1.000	.418	0.000	.162	.253	1.000	.350	.046		.046	.253	.039
	N	7	7	7	7	7	7	7	7	7	7	7	7	7	7
GURU	Pearson Correlation	1.000**	1.000**	-.258	.240	.764*	.645	.764*	.258	.730	1.000**	.764*	1	.764*	.889**
	Sig. (2-tailed)	0.000	0.000	.576	.604	.046	.117	.046	.576	.062	0.000	.046		.046	.007
	N	7	7	7	7	7	7	7	7	7	7	7	7	7	7
BAHULA	Pearson Correlation	.764*	.764*	0.000	.734	.500	.592	1.000**	.592	.418	.764*	.500	.764*	1	.898**
	Sig. (2-tailed)	.046	.046	1.000	.060	.253	.162	0.000	.162	.350	.046	.253	.046		.006
	N	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Total	Pearson Correlation	.889**	.889**	.030	.609	.778*	.810*	.898**	.466	.616	.889**	.778*	.889**	.898**	1
	Sig. (2-tailed)	.007	.007	.948	.147	.039	.027	.006	.292	.141	.007	.039	.007	.006	
	N	7	7	7	7	7	7	7	7	7	7	7	7	7	7

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