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Teaching Avasthapaka through Competency-Based Dynamic Curriculum: A Model for Sharirkriya Vignana in NCISM Framework

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ABSTRACT

Background: The National Commission for Indian System of Medicine has recently mandated a shift toward the Competency-Based Dynamic Curriculum, aiming to transform Ayurveda education into an outcome-oriented and skill-based system. Traditional pedagogical approaches often rely on the rote memorization of Samhita texts, which can lead to a gap between theoretical knowledge and clinical application. Avasthapaka, the triphasic process of digestion (Madhura, Amla, and Katu), is a fundamental concept in Sharirkriya that is frequently taught as an abstract theory without modern physiological integration. Objective: This study proposes a structured CBDC-based teaching-learning module for Avasthapaka designed to integrate classical concepts with modern physiology and competency-based assessments. Methods: A module was developed for 40 BAMS second-year students, incorporating Case-Based Learning, flipped classrooms, and Objective Structured Clinical Examination. The module mapped Charaka Samhita references with modern digestive phases and utilized standardized tools for Agni assessment. Results: Knowledge scores improved from 45.2 ± 12.3% to 78.6 ± 10.5% ($p < 0.001$), and OSCE performance increased from 40.5 ± 11.8% to 75.3 ± 9.6%. The educational impact showed a large effect size (Cohen's $d > 1.8$), with 72% of students reaching high competency levels. Conclusion: The Avasthapaka-CBDC model provides a scalable, integrated framework that enhances student engagement and diagnostic proficiency in Sharirkriya education.

Keywords: Avasthapaka, Competency-Based Dynamic Curriculum (CBDC), Ayurveda Education, Sharirkriya, Agni Assessment, Objective Structured Clinical Examination (OSCE)**.**

INTRODUCTION

1.1 Background of CBDC in Ayurveda Education

The transition to a Competency-Based Dynamic Curriculum represents a paradigm shift in the landscape of Ayurveda education in India. For decades, the curriculum was criticized for its over-reliance on the teacher-centric lecture model, where students were expected to memorize extensive verses from the Brihatrayi with limited clinical context. [1] The NCISM reforms seek to address these shortcomings by defining specific competencies—observable abilities that integrate knowledge, skills, and professional attitudes.[2,3] This revolutionary step in the curriculum is intended to make Ayurveda education more outcome-driven and globally relevant. [4]

Under the CBDC framework, subjects like Sharirkriya (physiology) are no longer viewed as isolated theoretical entities. Instead, they are the foundational blocks for clinical practice.[5] The curriculum emphasizes early clinical exposure and the use of modern pedagogical tools to bridge the gap between ancient wisdom and contemporary medical sciences.[6,7] This change is necessary because students often face a "crisis of confidence" when they cannot see the direct clinical relevance of the classical theories they study.

1.2 Importance of Sharirkriya in BAMS Curriculum

Sharirkriya is the study of the functional aspects of the human body according to Ayurveda. It forms the basis for understanding Prakriti (constitution), Agni (digestive fire), and Doshic balance, which are essential for diagnosis and treatment. However, teaching Sharirkriya faces significant challenges, particularly in conveying abstract physiological transformations.[8] Many students perceive the descriptions of Dosha functions or tissue formation as purely philosophical because they lack a clear correlation with modern physiological measurements. To overcome these challenges, the curriculum must move toward integrated models where classical concepts are explained through the lens of modern functional anatomy and biochemical processes.

1.3 Concept of Avasthapaka

Avasthapaka refers to the sequential transformation of food (*Ahara*) during the various stages of digestion. According to *Charaka Samhita* (Chikitsa Sthana 15/5–11), this process occurs in three distinct stages:[9]

Madhura Avasthapaka: The initial stage where food becomes sweet due to the action of saliva and early gastric secretions, leading to the predominance of *Kapha*.

Amla Avasthapaka: The intermediate stage where food undergoes an acidic transformation in the stomach and upper small intestine, resulting in *Pitta* predominance.

Katu Avasthapaka: The final stage where the remaining essence reaches the colon, undergoes drying, and becomes pungent, governed by *Vata*.

These stages are not static but represent a dynamic physiological journey essential for the formation of *Rasa Dhatu* (plasma) and the maintenance of systemic equilibrium.[10]

1.4 Modern Correlation and Research Gap

In modern medicine, digestion is categorized into cephalic, gastric, and intestinal phases. *Avasthapaka* provides a unique framework to understand these phases from a functional perspective.[10] For instance, *Madhura Avasthapaka* correlates with early amylase activity and mucin secretion, while *Amla Avasthapaka* reflects the acidic proteolysis and bile-mediated emulsification. Despite these clear parallels, there is a lack of structured teaching modules that help students visualize these correlations. Most textbooks provide separate accounts of Ayurvedic and Modern physiology, leaving the student to perform the difficult task of synthesis.[11] Furthermore, the use of objective assessment tools like OSCE to evaluate student proficiency in these concepts is still in its infancy within Ayurveda colleges.[3,12]

1.5 Aim and Objectives

The primary aim of this study is to develop and evaluate a CBDC-based teaching module for *Avasthapaka*. The specific objectives include:

To define measurable competencies and course outcomes for *Avasthapaka*.

To integrate classical *Samhita* references with modern gastroenterological physiology.

To implement active teaching-learning strategies such as CBL and flipped classrooms.

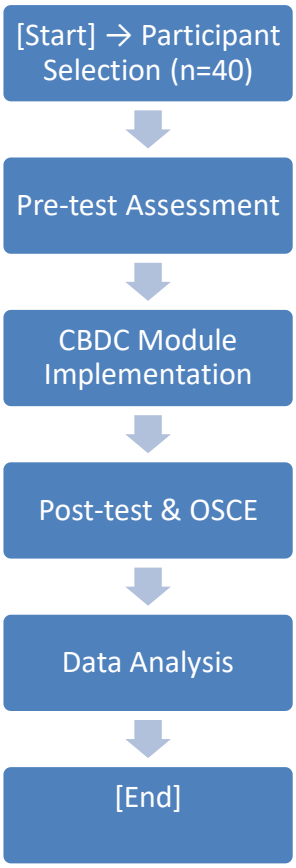
To validate the effectiveness of the module using pre-post assessments and OSCE-based skill evaluation.

2. Methodology

2.1 Study Design

This was an educational interventional study utilizing a "module development and pilot implementation" framework. The study aimed to move beyond the traditional "knows" and "knows how" levels of Miller's pyramid to the "shows how" level through simulated clinical assessments.

Flowchart 1. Study Design



2.2 Participants and Setting

The study was conducted with a cohort of 40 second-year BAMS students. Participant selection was based on their completion of basic *Sharirkriya* introductory sessions. Informed consent was obtained, and the demographic profile showed a mean age of 20.8 years, with a nearly equal gender distribution.

2.3 CBDC Module Framework

The module followed the Mento's change model for medical education, which emphasizes creating a sense of urgency, forming a powerful coalition of educators, and communicating a clear vision for change. [13] The competency defined for the module was: "Demonstrate an integrated understanding of the triphasic stages of digestion and clinically assess the status of *Agni* in a simulated patient".

Table 1. Competency Framework for Avasthapaka-CBDC Module

Domain	Competency	Learning Outcome	Assessment Method
Knowledge	Explain stages of Avasthapaka	Describe Madhura, Amla, Katu stages with modern correlation	MCQ (Pre/Post-test)
Integration	Correlate Ayurvedic and modern digestion	Map Avasthapaka with cephalic, gastric, intestinal phases	Case-based questions
Skill	Assess Agni clinically	Demonstrate Agnibala assessment using checklist	OSCE Station 2
Clinical reasoning	Identify pathology	Analyze Grahani/Amlapitta cases	OSCE Station 1
Management	Plan intervention	Provide dietary advice	OSCE Station 3

2.4 Teaching-Learning Strategies

The module employed a variety of student-centric methods:

Table 2. Teaching–Learning Strategies in CBDC Module

Strategy	Description	Learning Objective
Case-Based Learning	Clinical scenarios	Develop clinical reasoning
Flipped Classroom	Pre-class digital material	Promote active learning
Skill Lab	Agni assessment tools	Develop clinical competence
Integrative Lectures	Ayurveda + modern physiology	Conceptual clarity
Small Group Discussion	Interactive problem-solving	Enhance engagement

Case-Based Learning: Students were presented with clinical vignettes of *Grahani* and *Amlapitta* (gastritis). They were required to map the patient's symptoms to specific failures in *Avasthapaka* stages. [14,15]

Flipped Classroom: Students received digital pre-reading materials, including Samhita verses and modern physiological diagrams, 48 hours before the class. In-class time was dedicated to discussion and problem-solving.[16]

Skill Laboratory: Students practiced clinical assessment using tools like the *Agnibala* assessment scale and standardized checklists for *Jeerna Ahara Lakshana* (signs of proper digestion).[17,18]

Integrative Lectures: Short, focused sessions were delivered to explain the biochemical basis of *Madhura*, *Amla*, and *Katu* transformations.[19]

2.5 Assessment Methods

A dual-assessment strategy was utilized to measure both knowledge and skill

Table 3. OSCE Blueprint for Avasthapaka Module

Station	Task	Competency Assessed	Scoring Tool
Station 1	Identify Avasthapaka stage	Clinical reasoning	Checklist
Station 2	Perform Agni assessment	Clinical skill	Checklist
Station 3	Provide dietary advice	Management competency	Rating scale

Theory Assessment: A pre-test and post-test consisting of 50 Multiple Choice Questions designed to test clinical reasoning rather than rote recall.

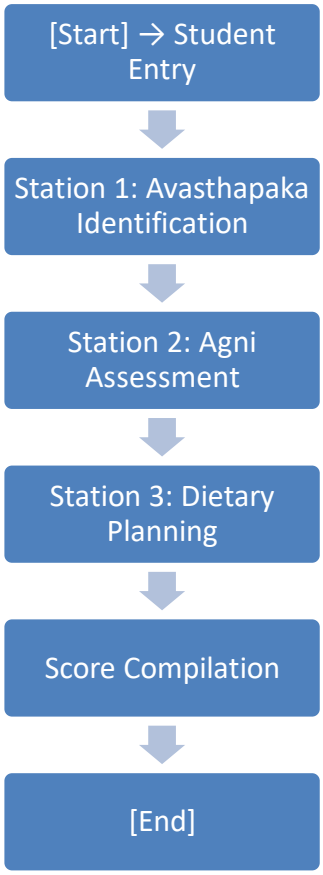
OSCE: This was used as the primary tool for skill assessment. [20] Three stations were designed:

Station 1: Identify the *Avasthapaka* stage based on a patient vignette and correlate it with modern secretions.

Station 2: Demonstrate the clinical assessment of *Agni* using a standardized checklist. [21]

Station 3: Formulate a dietary advice plan based on the identified *Avasthapaka* disturbance.

Flowchart 2. OSCE Assessment Workflow



OSCE was selected as the "assessment of choice" because it provides a standardized and objective measure of clinical competence, reducing examiner bias. [22]

2.6 Data Analysis

Statistical analysis was performed using paired t-tests to compare pre-and post-test scores. Cohen's d was used to calculate the effect size of the intervention. A p-value of <0.05 was considered statistically significant.

3. RESULTS

3.1 Knowledge and Skill Improvement

Table 4. Pre- and Post-Intervention Performance

Parameter	Pre-test Mean ± SD	Post-test Mean ± SD	p-value	Effect Size
Knowledge Score	45.2 ± 12.3	78.6 ± 10.5	<0.001	1.8
OSCE Score	40.5 ± 11.8	75.3 ± 9.6	<0.001	1.9

The intervention resulted in a significant improvement in both theoretical understanding and clinical skills. The mean knowledge score increased from a pre-test baseline of 45.2 ± 12.3% to a post-test score of 78.6 ± 10.5% ($p < 0.001$). [23] This suggests that the CBDC module effectively bridged the conceptual gaps in *Avasthapaka* theory.

The OSCE performance showed a similar trend. The mean OSCE score improved from 40.5 ± 11.8% to 75.3 ± 9.6% ($p < 0.001$). This indicates that students were not only able to understand the concept but could also demonstrate its application in a simulated clinical environment.

3.2 Competency Attainment Levels

Table 5. Competency Level Distribution

Competency Level	Pre (%)	Post (%)
High (>70%)	10%	72%
Moderate (50–70%)	32%	18%
Low (<50%)	58%	10%

Before the intervention, only 10% of students were in the "high" competency category (>70% score). Following the module, this number increased to 72%. Conversely, the number of students in the "low" competency bracket (<50%) dropped from 58% to 10%. The effect size analysis showed a Cohen's d of 1.8 for knowledge and 1.9 for skills, indicating a very high magnitude of educational impact.

3.3 Correlation Analysis

A strong positive correlation ($r = 0.68$, $p < 0.001$) was observed between post-test knowledge scores and OSCE performance. This suggests that students who mastered the theoretical underpinnings of *Avasthapaka* were more likely to perform better in clinical skill assessments.

4. DISCUSSION

4.1 Impact of CBDC on Conceptual Mastery

The results of this study demonstrate that the transition to CBDC is not just a policy change but a fundamental improvement in how Ayurveda is learned. Traditional teaching often treats *Avasthapaka* as a list of three stages to be memorized. By using CBL and flipped classrooms, we transformed these stages into a dynamic tool for clinical reasoning. Students were able to see *Avasthapaka* not as a set of static verses but as a functional framework for understanding digestion, which is consistent with the perspectives of teachers across India who have noted the potential of CBDC to improve medical reasoning. [24]

4.2 Integrating Avasthapaka with Modern Physiology

A major factor in the module's success was the structured integration of classical and modern perspectives. By correlating *Amla Avastha* with gastric acid secretion and proteolysis, the concept became tangible for students. This integration is crucial for addressing the current "dilemmas" in Ayurveda education, where students often feel they are learning two different and incompatible systems of medicine .[25] Modern digestive physiology research, including the role of gut microbiota as metabolic programmers, provides a contemporary lead for deciphering these ancient pharmacokinetic principles.

4.3 Skill Acquisition through OSCE and Simulation

The use of OSCE addressed the long-standing criticism that Ayurveda education lacks objective clinical assessment. While faculty perceptions often vary regarding the implementation of CBDC, there is a general consensus that objective assessments improve student accountability and performance.[26,27] Our findings confirm that health science students perceive OSCE as a fair and comprehensive method of evaluation.[28] The ability to clinically assess *Agni* and *Avasthapaka* is essential for managing conditions like chronic constipation and *Grahani*, where a purely symptomatic approach is often insufficient.[29,30]

4.4 Transitioning to Student-Centric Models

The shift in competency levels from 10% to 72% validates the move away from teacher-centric models.[31] Active learning strategies, such as the use of digital "Internet Plus" classrooms and interactive case discussions, empower students to take ownership of their learning. This is particularly important in subjects like *Sharir Rachana* and *Kriya Sharira*, where the sheer volume of information can be overwhelming for students.[32] By focusing on core competencies and clinical relevance, we can ensure that BAMS graduates are prepared for the realities of modern clinical practice.

4.5 The Role of Agni in Integrated Diagnosis

The module emphasized that *Avasthapaka* is the functional expression of *Agni* during the digestive process.[33] Understanding the relationship between *Agni* and metabolic disorders is a cornerstone of Ayurvedic internal medicine.[34] By providing students with validated tools to measure *Agnibala*, we move Ayurveda from a subjective discipline toward a more evidence-based and standardized practice. This aligns with the broader goal of NCISM to create a scientifically robust and traditionally authentic generation of practitioners.[35,36]

5. LIMITATIONS

This study was conducted on a small sample from a single institution, limiting generalizability. The short duration of the intervention did not allow assessment of long-term knowledge retention or clinical application. Additionally, reliance on simulated OSCE settings may not fully reflect real-world clinical performance.

6. FUTURE SCOPE

Future studies should include multi-institutional trials with larger sample sizes to validate the scalability of the model. Longitudinal follow-up is needed to assess retention and real clinical competency. Integration of digital tools and standardized Agni assessment methods can further strengthen competency-based Ayurveda education.

7. CONCLUSION

The integration of *Avasthapaka* into a Competency-Based Dynamic Curriculum represents a significant advancement in *Sharirkriya* education. This model effectively transforms an abstract physiological theory into a measurable clinical skill. By combining active teaching-learning strategies with objective assessment tools like OSCE, we can ensure that BAMS students achieve high levels of competency early in their careers. This integrated approach not only improves academic outcomes but also prepares students to apply Ayurvedic principles in a modern healthcare setting..

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