

Quasi-Experimental Evaluation of an Aṣṭa Smṛti Kārana-Based Teaching Model for Teaching Agra Dravya in Ayurveda Education

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Abstract— Background: Effective learning in Ayurveda requires strong memory and conceptual understanding. Classical Ayurvedic texts describe eight factors that improve memory, known as Aṣṭa Smṛti Kārana¹. These principles may help improve modern teaching methods. **Objective:** To evaluate whether a teaching method based on Aṣṭa Smṛti Kārana¹ improves learning outcomes compared with traditional lecture teaching in Agra Dravya².

Methods: A quasi-experimental study was conducted on 62 undergraduate Ayurveda students. Students were divided into two groups. Group A received traditional lecture-based teaching, while Group B was taught using a structured Aṣṭa Smṛti Kārana¹-based teaching model. A pre-test and post-test consisting of 20 MCQs were conducted to assess knowledge of Agra Dravya².

Results: Both groups showed improvement after teaching. However, Group B showed significantly higher improvement than Group A. The mean post-test score of Group B was much higher than Group A ($p < 0.05$).

Conclusion: Teaching based on Aṣṭa Smṛti Kārana¹ significantly improves understanding, recall, and application of Ayurvedic concepts like agra dravyas². This model can be useful for improving Ayurveda education.

I. INTRODUCTION

Ayurveda is a traditional medical system that gives great importance to Smṛti (memory) for learning and applying knowledge. According to classical Ayurvedic texts, memory plays an important role in understanding medical concepts and clinical practice. The classical text explains Aṣṭa Smṛti Kārana¹, which means eight factors that help in improving memory. These include:

- Nimitta³ – identifying the cause or trigger
- Rūpagrahaṇa³ – understanding cause and effect
- Sādrśya³ – learning through similarity
- Savipraya³ – understanding with purpose
- Punaḥśruta³ – repeated listening
- Abhyāsa³ – repeated practice
- Satvānubandha³ – emotional connection
- Jñāna-yoga³ – integration of knowledge

These principles show that Ayurveda already understood important learning methods such as repetition, comparison, and practical application.

One important topic in Ayurveda is Agra Dravya², which refers to substances that are considered the best for specific therapeutic actions. This topic requires memorization, comparison, and conceptual understanding.

However, most Ayurveda teaching today is lecture-based and does not fully use these classical memory principles.

Therefore, this study was conducted to test whether a teaching model based on Aṣṭa Smṛti Kārana¹ can improve learning outcomes.

Hypotheses of the Study

Null Hypothesis (H₀)

There is no significant difference between the learning outcomes of students taught by traditional lecture method and those taught by the Aṣṭa Smṛti Kārana¹ teaching model for the topic of Agra Dravya².

Alternative Hypothesis (H₁)

The Aṣṭa Smṛti Kārana¹-based teaching method significantly improves students' learning outcomes

compared to the traditional lecture-based teaching method for the topic of Agra Dravya².

II. METHODS

Study Design

This study was conducted using a quasi-experimental comparative design.

Two groups of students were compared:

- Control Group (Group A): Traditional lecture teaching
- Intervention Group (Group B): Aṣṭa Smṛti Kārana¹-based teaching

Both groups studied the same topic, but the teaching method was different.

Participants

The study included 62 undergraduate Ayurveda students.

Eligibility Criteria

Inclusion criteria:

- Undergraduate Ayurveda students
- Students attending the Agra Dravya² teaching session

Exclusion criteria:

- Students absent during pre-test or post-test
- Students who did not complete the assessment

Setting

The study was conducted in an undergraduate classroom of an Ayurveda college.

Intervention

Group A – Traditional Teaching

Students in Group A were taught through the usual lecture method which included:

- Verbal explanation
- Blackboard teaching
- Text discussion

This represents the conventional teaching method used in most classrooms.

Group B – Aṣṭa Smṛti Kārana¹ Teaching Model

Students in Group B were taught using a structured teaching model based on the eight memory principles.

The teaching process included:

1. Nimitta and Rūpagrahaṇa³ Understanding causes and relationships.

2. Sādhya and Savipraya³ Learning through comparisons and meaningful explanation.

3. Satvānubandha and Abhyāsa³ Emotional engagement and repeated practice.

4. Punaḥśruta and Jñāna-Yoga³ Repetition and integration of knowledge with application.

This method focused on active learning and memory reinforcement.

Allocation

Students were not randomly assigned. Instead, they were divided using academic stratification based on previous exam performance.

Students were categorized into:

- High performers
- Average performers
- Below-average performers

Then students from each category were distributed into both groups to maintain balance.

Roll Number–Wise Distribution

	GROUP A	GROUP B
Above average	1 10 18 25 29 48 55 62	2 16 22 27 43 50 59
Average	3 5 8 11 14 17 21 28 31 35 38 42 46 48 53 57 60	4 7 9 13 15 19 24 30 32 37 40 45 47 52 54 58 63
Below average	6 20 23 26 34 39 44	12 20 23 26 33 36 41 51 61
Total	31	31

Blinding

Blinding was not possible in this study because students and teachers were aware of the teaching method being used.

However, the same assessment method was used for both groups to maintain fairness.

Data Analysis

Statistical analysis included:

- Descriptive statistics (Mean and Standard Deviation)
- Paired t-test for comparing pre-test and post-test within each group
- Independent t-test for comparing results between the two groups
- ANOVA for comparing performance across academic levels

A p-value less than 0.05 was considered statistically significant.

III. RESULTS

Participant Flow

Total students included in the study: 62

- Group A (Traditional Teaching): 31 students
- Group B (Aṣṭa Smṛti Kāraṇa¹ Teaching): 31 students

All students completed the pre-test and post-test.

Baseline Data

Before teaching, the average scores of both groups were similar.

- Group A Mean Score: 2.03
- Group B Mean Score: 2.26

There was no significant difference between groups at baseline.

This shows that both groups started with similar knowledge levels.

Outcome Results

After teaching, both groups improved.

However, Group B showed much greater improvement.

Post-Test Results

Group	Mean Score
Group A	6.71
Group B	12.58

The difference between groups was statistically significant ($p < 0.05$). Percentage Improvement

Group A: 230% improvement Group B: 457% improvement

Test Results	Group A		Group B		Intergroup Analysis Independent t-test		
	Mean	SD	Mean	SD	t-value	p-value	Sign.
Before Teaching	2.0322	1.278	2.258	1.482	-0.6424	0.52310	Not significant
After Teaching	6.71	1.442	12.580	1.668	-14.820	1.6410 ⁻²¹	Significant
% Change	230.184		457.13				
Intragroup Analysis Paired t-test	-22.338		-31.674				
p-value	2.9910 ⁻²⁰		1.28610 ⁻²⁴				
Sign.	Significant		Significant				

This shows that the Aṣṭa Smṛti Kāraṇa¹ teaching model was much more effective.

IV. DISCUSSION

The present study shows that both teaching approaches helped in improving students' knowledge of Agra Dravya. However, the improvement was significantly greater among students who were taught using the Aṣṭa Smṛti Kāraṇa¹-based teaching model compared to those who were taught through the conventional lecture method. This finding suggests that integrating classical Ayurvedic cognitive principles into the teaching process can improve students' understanding and retention of academic content.

At the beginning of the study, both groups showed similar pre-test scores, which indicates that the participants had comparable baseline knowledge before the intervention. This similarity confirms that the difference observed in post-test scores was mainly due to the teaching method used rather than differences in the students' prior knowledge. Therefore, the results highlight the effectiveness of the Aṣṭa Smṛti Kāraṇa¹-based teaching approach in improving learning outcomes.

Lecture-based teaching is the most commonly used instructional method in higher education, including Ayurveda institutions. This method is useful for delivering theoretical information to a large number of students. However, it often involves passive learning, where students mainly listen to the teacher without actively participating in the learning process. Such passive learning may limit deeper understanding and long-term retention of knowledge.

In contrast, the Aṣṭa Smṛti Kāraṇa¹-based teaching model encourages active involvement of students in the learning process. This method promotes repetition, comparison, conceptual understanding, and mental engagement, which are important factors for effective learning. As a result, students are able to understand the subject matter more clearly and retain the information for a longer period.

Interestingly, several modern concepts of educational psychology also support similar learning strategies. Techniques such as spaced repetition, associative learning, elaborative rehearsal, and emotional engagement are known to improve memory and

understanding. These modern learning strategies show a close resemblance to the principles described in the classical Ayurvedic concept of Aṣṭa Smṛti Kāraṇa¹. For example, Abhyāsa³(repetition) is similar to spaced repetition, which helps strengthen memory through repeated exposure. Similarly, Sādhya³ (comparison or similarity) helps students connect new information with previously learned concepts. Sattvānubandha³ emphasizes emotional and mental involvement in learning, which modern research also recognizes as an important factor in improving memory. In addition, Jñānayoga³ and Tattva-buddhi promote deeper understanding of concepts, which is similar to elaborative learning techniques used in modern education.

Therefore, the better academic performance observed in the intervention group may be explained by the use of these classical memory-enhancing principles during teaching. By encouraging repetition, comparison, and conceptual understanding, the Aṣṭa Smṛti Kāraṇa¹-based model supports effective learning and improves students' ability to recall information.

The results of this study are also consistent with the educational principles promoted in the National Education Policy 2020⁵, which emphasizes conceptual learning, critical thinking, and student-centered teaching methods instead of rote memorization. NEP 2020⁵ encourages the use of innovative and interactive teaching strategies that actively involve students in the learning process. The Aṣṭa Smṛti Kāraṇa¹-based teaching model follows these principles by encouraging students to think, compare, and understand concepts rather than simply memorizing information.

Another important recommendation of NEP 2020⁵ is the integration of traditional knowledge systems into modern education. Ayurveda contains many classical educational principles that can contribute to modern teaching methods. The findings of this study indicate that concepts like Aṣṭa Smṛti Kāraṇa¹ can be effectively used as a teaching strategy in Ayurveda education to enhance students' learning experience.

In addition, learner-centered teaching approaches are known to increase student motivation, participation, and academic engagement. In the present study, students in the intervention group were encouraged to actively participate in discussions and conceptual analysis. This interactive learning environment may

have contributed to the higher improvement observed in their knowledge scores.

Despite these positive findings, the study has certain limitations. The sample size was relatively small and the study was conducted in a single institution, which may limit the generalizability of the results. Furthermore, the duration of the study was short and long-term knowledge retention was not assessed. Future studies should include a larger sample size, multiple institutions, and long-term follow-up to better evaluate the effectiveness of this teaching approach.

Overall, the results of the present study suggest that the Aṣṭa Smṛti Kāraṇa¹-based instructional model can serve as an effective teaching strategy in Ayurveda education. Integrating classical Ayurvedic cognitive principles with modern educational methods may help improve students' understanding, memory, and academic performance.

V. CONCLUSION

The results of the study showed that both teaching methods improved students' knowledge after the teaching session. However, the improvement observed in the group taught using the Aṣṭa Smṛti Kāraṇa¹-based teaching model was significantly higher than the group taught through the traditional lecture method.

Statistical analysis demonstrated that there was no significant difference between the two groups before teaching, which confirms that both groups had similar baseline knowledge. After the intervention, the post-test scores of the Aṣṭa Smṛti Kāraṇa¹ group were significantly higher, indicating greater improvement in learning outcomes.

Therefore, the null hypothesis (H₀) is rejected, and the alternative hypothesis (H₁) is accepted.

This indicates that the Aṣṭa Smṛti Kāraṇa¹-based teaching model is more effective than the conventional lecture-based method in improving recall, conceptual understanding, and application of Agra Dravya² among Ayurveda students.

The study suggests that integrating classical Ayurvedic memory principles into modern teaching strategies can significantly enhance learning effectiveness in Ayurveda education.

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